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# USSR Report

SCIENCE AND TECHNOLOGY POLICY

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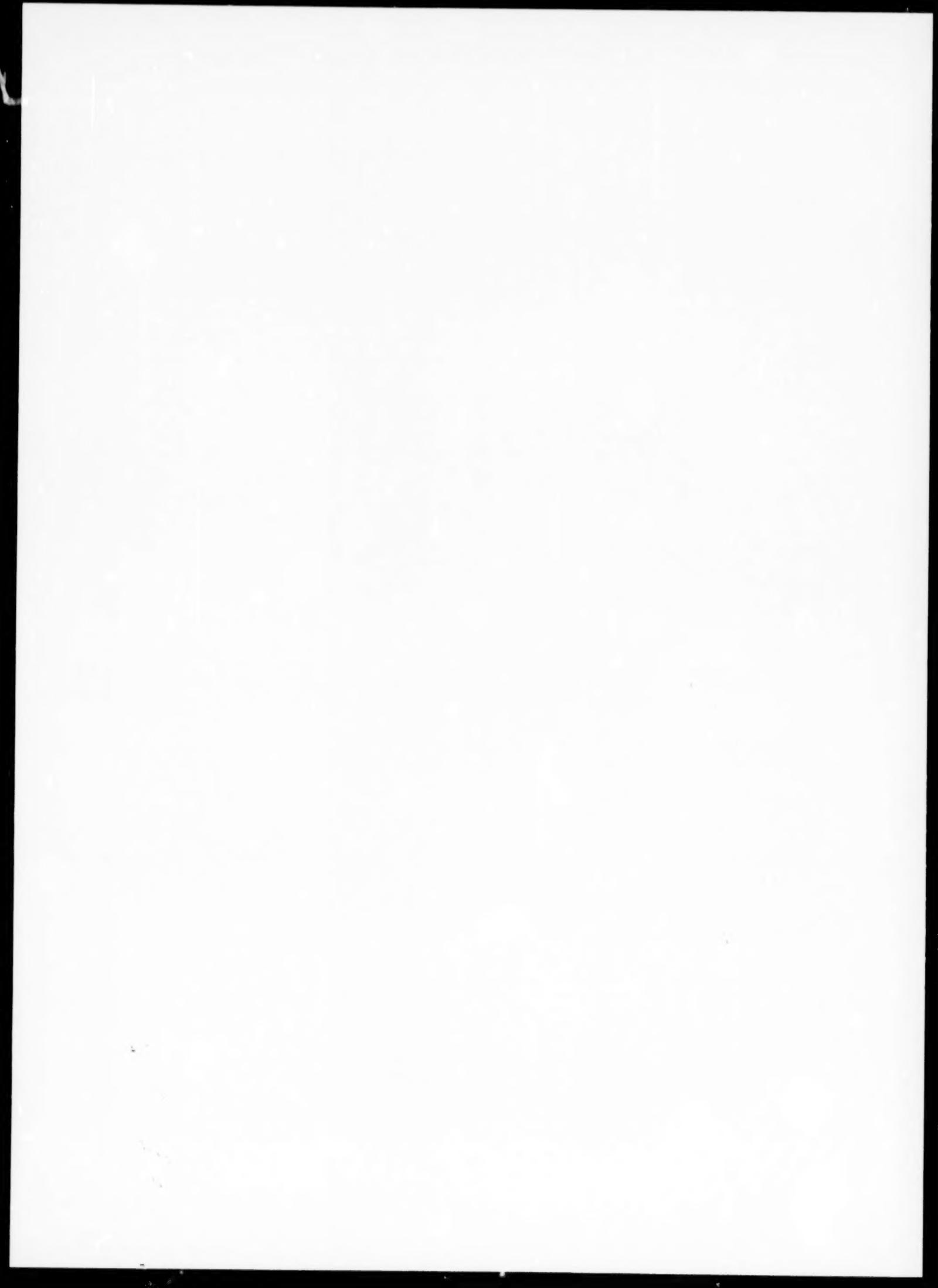
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## SURVEY OF EXPERIMENTAL BASE OF SCIENTIFIC INSTITUTIONS

Moscow VESTNIK STATISTIKI in Russian No 4, Apr 84 pp 31-35

[Article by L. Yesina, chief, Cultural Statistics Department, USSR Central Statistical Administration and I. Kuznetsova, senior scientific associate, Scientific Research Institute of the USSR Central Statistical Administration]

[Text] In accordance with the decisions of the 26th CPSU Congress and subsequent CPSU Central Committee Plenums, wide-scale measures are being implemented in the country to develop and introduce achievements of science and technology into the national economy, and to raise the effectiveness of scientific research.

The party and the government devote special attention to increasing labor productivity through automation of production processes and first of all of those where heavy manual labor is still used.

Pilot plants and experimental facilities of scientific institutions, where research results are tested and where new equipment and processes are fine-tuned in conditions most closely approximating industrial ones, occupy an important place in the development of new equipment and advanced technology. This, in the final analysis, accelerates the assimilation of new equipment and technology, shortens the time needed to assimilate new equipment in primary production, and raises the quality and technical level of production. Thus, experimental introduction is a most important link in the entire intensification process, in the development of a new technology.

In recent times serious attention has been devoted to the development and reinforcement of the experimental base of scientific institutions. At the same time, significant shortcomings still exist in this area. The decree of the CPSU Central Committee and the USSR Council of Ministers "On measures to accelerate scientific and technical progress in the national economy" notes that the pilot plant and experimental facilities of many associations, enterprises and organizations lag behind contemporary requirements, preventing any significant shortening of the cycle of work from research and prototypes to assimilation of new equipment in production operations.

For the purpose of a more complete analysis of the activities of experimental bases and test production facilities, the TsSU SSSR [USSR Central Statistical Administration] will organize a one-time selective survey of the experimental base of scientific institutions. Such a survey will be conducted for the first time and will encompass one of every two scientific institutions (VUZ) [higher educational institution], which will provide information on the state of the experimental base of various types of scientific institutions in all sectors of the national economy.

The experimental base of a scientific institution consists of one or more production installations engaged in tests or experimental work. It includes experimental plants with various organizational forms and various degrees of economic independence, subordinate to the scientific institution, carried on its balance sheet, and constituting a part of its structural subdivisions, and also test production facilities on their own independent balance, if their subordination to the scientific institution is stipulated in an official document. These can be workshops, sectors, shops, factories, plants, as well as experimental fields, stations and farms with various numbers of workers.

Some scientific institutions use the base of other enterprises to carry out experimental work.

Experimental work includes the fabrication and testing of experimental specimens (test lots) of new products and equipment, fine-tuning new (improved) process technology, fabrication of mock-ups, test stands, installations, non-standard equipment, etc.

A statistical reporting form for scientific institutions (VUZ) on their experimental facilities (f. No. OB-1) with instructions for filling it in has been approved for carrying out the survey.

The reports are compiled by selected scientific institutions, including higher educational institutions, regardless of whether they have their own experimental base or use the bases of other enterprises. If an additional check confirms the absence of an experimental base at a scientific institution (VUZ), it must fill in the following data in form No. OB-1: information on the employment rolls and number of scientific workers, capital investments into the construction of its own experimental base, and on developments (projects) carried out, completed and implemented in 1983.

The scientific institutions (VUZ) included in the group surveyed must organize the compilation of data in the amount provided for in form No. OB-1 for each production installation constituting the experimental base.

In order to complete the survey form, primary accounting documentation should be used: inventory registers, equipment flow cards,

parts inventory cards for each piece of equipment, equipment certificates, long-term thematic plan for scientific work, manpower plan, work orders, plan for introduction of new equipment, construction title list, tariff scale, bookkeeping documents, etc.

The documents used must be verified and corrected by the date of the survey. The scientific institutions will submit the completed survey forms (f. No. OB-1) by 10 May 1984 to oblast, kray or ASSR statistical administrations, depending on the location of the institution, and in republics without oblast subdivision, to the TsU of the Union republic.

Information included in form No. OB-1 is given as of 1 January 1984, or else for the year 1983.

Form No. OB-1 consists of six parts, with indices describing the types of experimental facilities and their economic affiliation, available equipment, participation in and completion of scientific projects and expenditures for these purposes.

The form includes data describing the features of the experimental bases providing services to agricultural scientific institutions.

The instructions for compiling the form describe the procedure for filling it out. We shall touch upon some aspects.

The first section reflects the total number of employees in the scientific institution, including technical and service personnel, workers employed in auxiliary and subsidiary enterprises and at the experimental facilities on the balance sheet of the given institution (employees at an experimental facility on its own independent balance, as well as those hired in permanent positions but working in an outside capacity are not included on this roster). The number listed on the scientific staff of the scientific institution surveyed must correspond to similar data in the current report for 1 January 1984 (f. No. 5-nk).

The second section contains data on the entire experimental base of the scientific institution, as well as on each experimental facility comprising the base. It should be kept in mind that an experimental facility of an outside organization used by the scientific institution for experimental work is excluded from this section.

The subsequent sections of the survey form contain data on the scientific institution's experimental base as a whole.

The data in the second section describe the experimental base complement of production facilities, with those requiring major overhaul singled out, the amount of capital investments, number

of employees at the experimental base, and the availability of highly skilled workers. Agricultural scientific institutions indicate the areas of agricultural lands, stocked fish ponds and bodies of water on the experimental farms in addition to the production areas of enterprises, shops and laboratories.

The third section gives a description of the industrial equipment at the experimental base, provides data on the quantity and value of installed and uninstalled imported equipment. Specially built equipment which is needed for the carrying out of tests and experimental work is also accounted for in this section.

To determine the age structure of equipment, the following groupings are used for length in service: up to 3 years, 3 to 5 years, 5 to 10 years, 10 to 20 years, and 20 years and over.

Production equipment at the experimental base is broken down into three groups: general production, special processes, and special equipment for conducting tests and experimental work.

For agricultural scientific institutions this section includes additional data, reflecting the features of the experimental bases and their labor force, in particular, data on the presence and value of productive and working livestock, poultry, etc.

The fourth section shows the number of all scientific projects pursued during 1983, their estimated cost is given, including for work with the participation of the experimental base. Scientific work using the experimental base is divided into three groups: that performed with the participation of the institution's own experimental base, with bases of other enterprises, and with the participation of both kinds of facilities.

One of the important indices describing the activities of a scientific institution is the duration of tests and experimental work.

Within the framework of one completed scientific project, several test or experimental efforts may be carried on; their sum total for each completed subject (project) is grouped according to the total duration of their implementation. In case several experimental efforts were carried on the same project, at different times and at different types of experimental facilities, the sum total of their duration is indicated. If on some project the tests and experimental work were carried on simultaneously at different types of experimental facilities, the duration of the longest effort is indicated. The duration of a specific test or experimental effort is counted from the moment it is turned over to the experimental base for execution. This period includes not only the time of direct test or experimental work, but also the time involving delays in its execution at the experimental bases.

The fifth section gives data on the volume and value of work (output produced) performed by the institution's own experimental base in 1983, including experimental [pilot plant] production destined elsewhere. For experimental production installations on their own independent balance whose output is destined for elsewhere, data is given on the marketable output in comparable prices.

The cost of tests and experimental work performed for a scientific institution by experimental bases belonging to other enterprises are given as a note to section five.

The sixth section shows the total number of thematic projects assimilated in accordance with the plan during the fiscal year, regardless of the time of completion of the work. Singled out from this total number are thematic projects carried out with the performance of tests and experimental work--at the institution's own experimental base, at the base of another enterprise, and at the experimental base of the scientific institution and of another enterprise. The costs of carrying out and assimilating them are determined for each of the thematic projects for the entire period, as well as the economic gain from their assimilation.

The section provides for an indication of planned and actual assimilation of thematic projects at the institution' own experimental base.

On the whole, the indices in the report will make it possible to quite fully reflect the utilization level of experimental bases. However, the quality of the survey will depend to a great deal on the performance of the State statistical organs, which must carry out appropriate instructional work, provide scientific institutions with blank forms, and organize verification of the authenticity of data included in the report.

After a thorough check of the reports received, the results of the survey will be compiled. For this, summaries will be entered on the original forms according to certain groups of scientific institutions, and four processing tables will be compiled.

All scientific institutions will be divided into four groups: those having their own experimental base, not using the bases of other enterprises; having their own and using the experimental bases of other enterprises; not having their own and using bases of other enterprises; and those having none and not using other experimental bases. The summary is compiled on a blank of form No. OB-1 on the whole for all scientific institutions surveyed, with data extracted on scientific institutions of industrial ministries, 11 machine building ministries (including from the summary of the industrial ministries), the USSR Ministry of Agriculture (including VASKhNIL) [All-Union Order of Lenin Academy of

Agricultural Sciences (ment. V. I. Lenin), and the scientific institutions of the USSR Academy of Sciences system. Then the blank for a No. OB-1 are used to summarize data on the first three groups of scientific institutions named above. To keep track of the number of scientific institutions included in the summaries, a mark is made in a special column of coded boxes. Thus, each statistical administration must furnish the full volume of processed data, even if individual tables are not filled in. Special attention should be paid to filling in the boxes in sections 1-3 and 5 of the summary No. OB-1 forms. These boxes show the number of scientific institutions included in the summary, which show the corresponding indices filled in on their original reports. For example, section 3 of the summary report shows the number of scientific institutions which filled in data on installed imported equipment in their original reports.

In processing table No. 1 data is given on all scientific institutions surveyed, distributed by individual ministries (departments). Thus, data on the totals line of this table must match the corresponding data of the summary table No. 1, which was compiled for all scientific institutions.

Processing table No. 2 shows the number of experimental production installations constituting the experimental base of the scientific institution. Here, data on the total number of experimental bases at scientific institutions and the total number of the work force must be equal to corresponding data shown in table No. 1.

Processing table No. 3 is compiled using the reports by scientific institutions which indicated information on both completed and on assimilated thematic projects. The number of institutions included in this material may be less than the total number of scientific institutions, by virtue of the scientific institutions which filled in section 4 of the report, but not section 6, or filled in section 6, but not section 4, or filled in neither section 4 nor 6.

Processing table No. 4 contains data on experimental facilities by separate types (plants, shops, laboratories, etc.). It is necessary to do a detailed distribution of experimental production facilities by type, so that the data included in the line "other production facilities" would be as few as possible. The total numbers of the work force at experimental production facilities in the totals line (in total) must be equal to the corresponding data in processing tables No. 1 and 2.

For scientific institutions with an experimental base with a work force of 300 and more, a list is compiled in which individual information for each scientific institution is presented from form No. OB-1 (number of thematic projects completed and assimilated, total number of employees, etc.).

The data of the survey must be thoroughly checked, similar data from the various summaries and tables must be coordinated with each other, and an arithmetical check must be performed as indicated by the data contained in the columns and lines of the form and the tables.

Copies of reports on form No. OB-1 for the leading higher educational institutions are presented with the summary reports and the processing tables (a VUZ list is given in an attachment to the instructions for processing the survey results) and with an explanatory note showing the percent of survey coverage and giving appropriate explanations for processing.

The deadlines for presenting the survey results are determined by the plan for statistical work of the TsSU SSSR and the TsSU of the Union republics.

The results of the survey will permit a calculation of the average duration for the completion of test and experimental work, and determine the effect of experimental production on this duration.

Using summary data on the volume of completed test and experimental work, an estimate is given of the utilization of experimental bases of scientific institutions in accordance with their basic purpose--experimental verification of the results of scientific work.

The survey results will disclose the effect of availability of experimental bases to scientific institutions on the effectiveness of their operation. For this, indices are calculated such as the ratio of annual economic gain from using the results of scientific work to the cost of completing and assimilating thematic projects, and the proportion of completed projects out of the total number of thematic projects worked on and completed. These are calculated (for purposes of subsequent comparisons) for all scientific institutions as a whole, as well as for individual institutions, depending on the presence of an experimental base, which will permit determination of which scientific institutions have the higher indices.

Special analysis should be made of the activity of institutions without an experimental base and not using those of other enterprises, what their work force is, what volume of scientific work they perform, and the effectiveness of their activity. The analytical notes should cite specific examples of these scientific institutions, indicating the ministries (departments) under whose jurisdiction they are.

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## RECONSTRUCTION, REEQUIPMENT OF ENTERPRISES

Riga KOMMUNIST SOVETSKOY LATVII in Russian No 4 Apr 84 pp 49-55

[Article by T. Dushkevich, first secretary of the Daugavpilsk gorkom of the Communist Party of Latvia: "Reconstruction and Re-equipment of Enterprises: Experience and Problems"]

[Text] The proceedings of the December (1983) and February (1984) plenums of the CPSU Central Committee devote a large place to problems related to the introduction of the achievements of scientific and technical progress into production. "As regards the basic directions of the development of our economy, these are clearly determined by the party," indicated K. U. Chernenko at the February Plenum of the CPSU Central Committee. "Intensification, accelerated introduction of the achievements of science and technology into production, the implementation of major comprehensive programs--all these must in the final analysis lift the productive forces of our society to a qualitatively new level."

The attainment of the objectives set by the party requires a skillful utilization of forces and resources, and efficient organization at all levels of party and economic leadership. The success in this matter is directly dependent on the skill of party organizations in mobilizing collectives to realize this objective.

Implementing party leadership of the economic activity of enterprises and organizations and directing the efforts of labor collectives toward raising production efficiency and quality of all work, the Daugavpilsk city party committee attaches great significance to issues related to reequipment of production enterprises and to a continuing growth of labor productivity on the basis of the introduction of the achievements of technical progress and an improvement in the utilization of fixed assets. In doing this, the gorkom strives to structure its operation in such a way so as to ensure a systemic approach to attaining the main objectives and a high effectiveness of the influence of the party.

A five-year general city plan for raising the technical level and efficiency of production has been developed and is being implemented with the objective of active mobilization of workers and implementation of control over the activity of production collectives. This document defines not only the end results which must be achieved, not only the main technical and economic indicators, but also the ways to attain these achievements. For example, this plan provides for a nearly one-third increase in the number of automatic and semi-automatic machine tools in the city's industry; the number of comprehensively mechanized sectors will increase 1.5 times, and of conveyer and production lines by 15 percent. The indicators of production mechanization levels have been determined, and the capital-labor ratio is planned to be raised by 19 percent. Similar plans have also been developed for the city's enterprises.

A great deal of work on production equipment replacement and improvement of production processes is under way at the drive chain plant, for example. Measures providing for the development and introduction of advanced technology, mechanization, automation and new equipment are being implemented in a timely and complete manner at this enterprise. The party organization is constantly monitoring their implementation. In the hot forging shop, for example, high-output heating units for nitrogen case-hardening as well as high-speed presses have been installed. At this same plant a process was introduced for fabrication of bicycle pedal spindles by the reduction method, permitting the freeing of 25 people, elimination of 22 pieces of metal-cutting equipment, and a saving of nearly 120 tons of rolled metal stock.

A significant role in raising the technological production level at the plant was played by its own machine-tool building shop, the establishment of which was caused by the necessity to replace obsolete imported equipment with more efficient equipment and the absence of specialized enterprises in the country for its production. Many developments by specialists at the plant were awarded inventor's certificates, and motorcycle chain assembly machines and chain bushing and roller fabrication machines, which ensure nearly doubled labor productivity, were awarded silver medals at the Exhibition of the Achievements of the USSR National Economy.

The implementation of measures on reconstruction and reequipment of the enterprise made it possible to increase output production by 16.4 percent during three years of the current five-year plan, and labor productivity by 16.5 percent. Attained were savings of 760 tons of ferrous metal rolled stock and 2 million kWh of electric power. 180 people were relieved of manual labor, and 48 jobs were eliminated.

At the present time the machine-tool builders of the plant are working on the development of flexible production technology,

permitting a rapid changeover to the fabrication of one or another type of drive chains. Work is also under way on the building of a robot machinery sector in the consumer goods shop, which is planned for commissioning in the second quarter of this year.

Other production collectives of the city have also embarked on the course toward reconstruction and strengthening of the material and technical base of enterprises. Practically every year the chemical fiber production capacities increase at the Order of Labor Red Banner Khimvolokno production association imeni Lenin Komsomol. Furniture production is developing intensively. A forging shop has been placed in commission at the locomotive repair plant. Production capacity has been considerably expanded at the construction materials and structural members plant, the technology of manufacturing keramzit concrete panels and silicate brick has been improved here. The Latvremstanok [Latvian Time Instrument] Plant is increasing its output production. In accordance with socialist commitments, the workers of the city have placed in operation production capacities for 40 tons of whole milk products at the dairy combine ahead of schedule, by 15 December of last year.

Each year over 600 measures on the introduction of achievements of science and technology are implemented at the city's enterprises. Highly productive machine tools with numerical programmed control and processing centers are being used on a continuously expanding scale; they are used at the drive chain plants, the locomotive repair, Elektroinstrument, and Latvremstanok plants. Their use is forced by life itself.

For example, the Elektroinstrument Plant is specialized in the production of impact tools--electric hammers, hammer drills and tampers. These are complex products, requiring high fabrication precision. Electric hammer drills occupy a special place among these products. A highly effective multi-purpose hammer drill designed for mechanization of construction and installation work was developed in 1982. This tool is capable of rapidly drilling holes in concrete, metal and wood, driving bolts and wood screws, chopping metal, and breaking up concrete and brick. A group of specialists, including enterprise Director Arkadiy Yakovlevich Kapustin, were awarded a USSR State prize for its development and production. But an increase in the output volume of impact tools and their quality improvement require a new approach to the level of production equipment and technology. It is becoming impossible to fabricate such an electric tool using traditional production technology and general-purpose equipment. For this reason the plan was made at the plant to install special highly efficient equipment and numerical program controlled machine tools. This gave tangible results. The installation of multiple-tool horizontal boring machines with numerical program control made it possible to double labor productivity in machining tool-housing parts, use multiple machine operation, and improve machining quality.

A multi-coordinate measuring machine with a computer was placed in operation at the plant. Its use made it possible to perform measurements of intricate parts with a high degree of precision in accordance with a program, with mechanization of quality control work performed during labor-intensive inspection operations.

All this work at this enterprise, as well as at many other production collectives, is being performed under the constant leadership and monitoring by party committees and buros in close contact and cooperation with scientific and design engineering organizations and higher educational institutions.

In the course of implementation of the republic-wide comprehensive program at the city's enterprises, specific efforts are under way aimed at reduction of the use of little-sought manual labor. The results of these efforts were scrutinized in 1983 at a session of the gorkom party buro, which summarized the results of what was accomplished, and charted out the objectives for the upcoming period.

On the whole since the beginning of the five-year plan period, the number of workers engaged in manual labor was reduced by over 400, and of those working in adverse conditions, by 1,100. At first glance the results are not bad, but it should be realized that our realistic possibilities are much greater. This is why the party organizations and economic managers have been given the task of intensifying efforts to mechanize and automate labor at each workplace, to certify each job as corresponding to the requirements of scientific organization of labor, and to implement the latter in a more active and purposeful manner.

With the aim of better mobilization of existing reserves, the defense of draft plans and socialist commitments by production collectives has now been practiced in the city for a number of years. These drafts indispensably include issues related to raising the technical level, the reequipment of enterprises. The leading enterprises defend their plans and commitments at sessions of the gorkom party buro, and the rest at the industrial and transport department. This is preceded by a defense of the commitments at collective meetings on all levels of production, beginning with individual workers and brigades, to the shop and shift level. To ensure a specific and business-like discussion, there is a thorough preliminary analysis of the draft plan and commitments for the relevant period, and available reserves and possibilities of the enterprise collective are studied. Such an approach helps the city's workers as a whole to develop and adopt intensive socialist commitments.

Accumulated experience also showed the advisability of setting up effective staffs in the city to coordinate efforts to monitor the fulfillment of accepted commitments. Such staffs include workers

of the party gorkom, the city council executive committee, control organs, party organization secretaries, and managers and specialists of enterprises. For example, the staff monitoring construction and reconstruction of the city's enterprises is actively at work. It assumed control monitoring over the most important projects--the doubling-and-weaving block at the Khimvolokno production association, power engineering and other facilities. Staff sessions were held directly at the projects themselves for the purpose of studying the state of affairs in greater depth. Reports were presented by management personnel of construction and subcontracting organizations as well as by customer enterprises, and the most rational decisions were collectively worked out. Such an approach made it possible to ensure the on-schedule commissioning of all facilities monitored by the staff and promoted a strengthening of the functional relations between builders and customers.

In this connection the initiative of the workers of the Khimvolokno production association and the general construction trust should be noted; they made a commitment to place production facilities with a capacity of 1,500 tons of chemical fibers annually in operation a year ahead of schedule. The gorkom party buro approved this initiative, and the commitments were coordinated with the appropriate Union ministries.

The counter-plan approved for 1983 was successfully realized.

It should be emphasized that the experience of joint efforts by the workers of the Khimvolokno production association with the builders on the reconstruction of this enterprise, which have continued for a number of years, deserves the closest possible attention.

Active reconstruction began here in 1973. The party organization and the entire labor collective were given a difficult task to be accomplished not only without production stoppage, but also with an increase in the output. At that time neither the enterprise nor the construction and installation workers who built it had had any such experience. The matter was also complicated by the fact that the reconstruction took place in operating shops, where the production process required that an artificial atmosphere had to be maintained. All this required the party organizations, plant managers and workers to exhibit maximum concentration and a high sense of responsibility for the task entrusted them.

Extensive and thorough study of the design documentation by the builders and the clients facilitated the successful carrying out and speeding up of the reconstruction. As the result, a number of criticisms were issued, and more effective decisions were accordingly adopted in a timely manner, with changes entered into the project design.

Considering the already mentioned specific production conditions (continuous processes, special climatic conditions), the dismantled areas were isolated from operating production sectors. Innovative thinking played an important role in this. The chemists as well as the builders made their contribution to solving many complex problems related to the implementation of the approved program.

In these circumstances the party committee of the association was accomplishing two basic tasks. By raising the vanguard role of party members engaged in production work, it created a favorable microclimate among the workers, striving to prevent any decrease in production rates despite certain difficulties. And at the same time, supported by the shop party organizations and the broad Komsomol and trade-union aktiv, it endeavored to render effective assistance to the builders in the process of reconstruction. All mass political work in the association was aimed at attaining this objective, and propaganda and political information specialists as well as lecturers and agitators became involved in it. Each worker was guided toward making socialist commitments aimed at the most rapid mastering of new equipment. Efforts were broadly expanded to develop the scope of equipment operation and service and to an ahead-of-schedule attainment of personal production goals.

During the most intensive period of the reconstruction work the party committees of the association and the general construction trust established party commissions to monitor the activities of the administration, as well as ad hoc party groups whose main purpose was to exert a salutary influence on the maintenance of work schedules.

As the result of the efforts made, the association work force constantly increased the output growth rate during the entire reconstruction period, and repeatedly came out the winner in All-Union socialist competition.

In the current five-year plan work is continuing on further reconstruction of the association. Plans call for placing a total of 12,000 tons of chemical fiber production capacity in operation. Production capacities for 8,000 tons have already been commissioned.

Measures aimed at raising production efficiency on the basis of reconstruction and reequipment of enterprises helped to achieve positive results in economic performance. During three years of the five-year plan the industrial output in the city rose by 12.4 percent and labor productivity rose by 8.8 percent, which is in excess of the planned goals. Manufactured products in an amount of over 18 million rubles were sold in excess of the year's plans. The output of products bearing the State Emblem of Quality

has increased 1.4 times. The production cost and materials consumption of the output have been reduced, and profit has risen.

At the same time we understand clearly that we still have done far from everything. Many shortcomings occur in the work on reconstruction and reequipment of the enterprises. And first of all one should mention the Daugava Footwear Combine, which attains less than half of its output volume increases through labor productivity. This is due to the fact that the reconstruction project for the enterprise provides for essentially old production technology. Practically no changes were made other than an increase in the number of jobs. Naturally, the output increased, but basically not due to any growth in labor productivity, which would have corresponded to present stage economic strategy, but due to an increase in the number of workers. This led to certain difficulties in supplying the combine with labor, affected the quality of the footwear produced, and failures to meet plan goals appeared. It is perfectly clear that this sort of reconstruction falls short of the set objectives, and we address a reproach for this to the Ministry of Light Industry of the republic.

A whole series of enterprises in our city urgently needs reconstruction and modernization of equipment, however, questions related to this are often resolved too slowly.

For example, the working conditions are difficult at the oldest enterprise in Daugavpils--the Locomotive Repair Plant imeni Yan Rudzutak. The first production line method of diesel-electric locomotive repair in the country was introduced here in 1967, and on this basis the highest output coefficient per square meter of industrial area among related enterprises of the USSR Ministry of Railways was attained. High labor productivity has been achieved at the enterprise, and the cost of locomotive repair was significantly reduced. As the result of a steady rise in production efficiency and labor productivity and organization, at the present time the planned production capacity for repair of diesel-electric locomotives and electrical machinery has been exceeded by a factor of 1.6, and that for diesels by three times. But at the same time the main production shops--locomotive assembly, electrical machinery and diesel repair are operating in extremely cramped conditions. The shortage of industrial space in some sectors of these shops is up to 50 percent of plan norms, and as a result of this working conditions here are far from meeting present-day conditions and sanitary standards. Other shops and sectors, as well as the lubricants and storage departments, also need reconstruction.

The plant work force carries out certain measures aimed at eliminating the existing production bottlenecks by its own efforts. For example, a new forging shop has been built and commissioned, and its former space was rebuilt for the purpose of organizing

and placing in operation a shop for the production of diesel engine cylinder liners. Installations for treatment of waste water from cleaning machines were placed in operation in 1983.

However, it will be difficult to attain further output growth and efficiency, significant output quality improvement and better working conditions without considerable reconstruction of the enterprise. This was planned as early as 1980, and it was planned to allocate capital investment in the amount of 19 million rubles for this purpose. However, to this day the design work has not been performed and reconstruction has not begun.

The work force of the Elektroinstrument Plant finds itself in a similar situation. Expansion of this plant was also planned several years ago. However, here the work on planning the equipment and labor requirements for the production technology part of the plant expansion project has already been completed. In accordance with the target it is planned to increase the annual output by 14.4 million rubles while retaining the labor force at the present level. This must be achieved by using the most advanced equipment. The design institute has prepared the technical documentation for the preparatory period. But the final target dates and the amount of capital investment needed for plant expansion have not yet been determined.

We are especially disturbed by the issue of reconstruction of the construction materials and structural member plant. This problem directly infringes upon the interests of many inhabitants of the city. The point is that the plant is the only supplier of structural members for residential building construction in the city and the region. At the present time construction has begun on the new Pervomayskiy residential district in Daugavpils, but unfortunately it is being built up of buildings of an obsolete series. The production technology development plan for the enterprise had provided for a shift to the production of construction elements for the 104th series of buildings, however this is hardly advisable now: an expert commission of the Latvian SSR Ministry of the Construction Materials Industry and specialists of the general construction trust have concluded that this series has a multitude of deficiencies, in comparison with current series it requires greater labor-intensiveness in the fabrication of structural elements and in construction methods, it has inconvenient apartment layouts, and is architecturally undistinguished. Time is passing, but no final decision has been made yet on the further prospects for the development and reconstruction of the enterprise.

Unfortunately also remaining unresolved is the question of the reconstruction of the Latgales Konservi production association, which operates with a low level of production technology and equipment. Work on reequipment of some other enterprises in the city must proceed in a more active and goal-oriented manner.

In the decree by the CPSU Central Committee and the USSR Council of Ministers "On Measures to Accelerate Scientific and Technical Progress in the National Economy" issued in 1983, confidence is expressed that workers and employees, scientists, engineering and technical workers of scientific research, design, project planning, project design and technology organizations, associations and enterprises will do everything necessary for the successful attainment of the objectives set by the party to accelerate scientific and technical progress in the national economy of the country. The workers of Daugavpils too to make their feasible contribution to the attainment of these goals. To do this we must make broader use of the experience gained in reequipment and reconstruction of enterprises, persist more in eliminating existing shortcomings, and with a certain assistance and support of the appropriate ministries, successfully solve the problems encountered on this path.

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## LEGAL STATUS OF MIDDLE-LEVEL TECHNICAL DECISIONS

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[Article by Yaak Ostrat, submitted by I. Epik, Special Design Bureau of Computer Equipment of the Institute of Cybernetics of the Estonian SSR Academy of Sciences: "The Middle-Level Technical Decision as an Object of Legal Regulation"]

[Text] The development of new technical decisions is one of the decisive factors of the acceleration of scientific and technical progress, which had and is having a substantial influence on the improvement of social physical production. The Fundamental Law<sup>1</sup> of our country, in the provisions of which the political, economic and social importance of creative scientific and technical work as one of the types of rights and freedoms of citizens, which are guaranteed by the Soviet state, found reflection, also emphasizes the state importance of this activity.

Of great importance for the increase of the efficiency of creative scientific and technical work and for the aiming of the creative potential of the members of society at the accomplishment of the tasks facing our economy is the improvement of the legal regulation of the social relations which arise in connection with the development and use in the national economy of the results of this type of creative work.

The questions of the improvement of the legal influence on creative scientific and technical work have constantly been a subject of research of Soviet lawyers. However, in connection with the drafting of the USSR law on the development of inventions<sup>2</sup> the problem of the group of legally recognized objects holds one of the central places in this research. For the most part this problem is being examined in two directions. First, the advisability of the inclusion in a single act of all objects, the questions of the legal protection of which are regulated by various standardized acts,<sup>3</sup> is analyzed. Different opinions are expressed in the literature in this regard. Some authors consider it necessary to unite all protected objects into a law,<sup>4</sup> others also acknowledge as permissible in principle such a situation, when the law regulates the legal protection of the results of creative scientific and technical work of the highest level (discoveries and inventions), while legal

protection is granted to other objects (production prototypes and efficiency proposals) by acts of executive and administrative authorities of the state.<sup>5</sup> Second, it is proposed to set up in Soviet invention law a new institution--the institution of the small invention or useful model.<sup>6</sup>

The proposal on the legalization in the USSR of the legal protection of useful models arose from the purposeful critical analysis, to which the legal definition of a protectable invention, which was recorded in Paragraph 21 of the Statute on Discoveries, Inventions and Efficiency Proposals, which was approved by Decree No 584 of the USSR Council of Ministers of 21 August 1973, was subjected mainly in 1980-1982. In the literature it was noted that in recent times a definite decrease of the prestige of the authorship certificate for an invention has been observed,<sup>7</sup> and the inadequate soundness of the criteria of a protectable invention was regarded as the reason for this.<sup>8</sup> The majority of authors recognized as poor first of all the criterion "substantial differences" and substantiated their opinion by the fact that this criterion does not contain a condition which envisages that the solution of the problem, which constitutes the essence of the invention, should be of a creative nature.<sup>9</sup> On this basis it was proposed to increase the standard demands on inventions, mainly by the replacement of the criterion "substantial differences" with the criterion "progressiveness" or "nonobviousness." In the opinion of the supporters of this innovation, such a novel thing would make it possible to increase by a standardized means the role of the creative nature of the solution of a problem in the legal definition of an invention and to separate insignificant developments from truly important solutions, which should only receive legal protection as inventions.

Against the background of the numerous critical statements meant for the criterion "substantial differences" individual voices in defense of it were also encountered. For example, L. V. Chervova<sup>10</sup> noted that the difficulties in the practical use of the criterion "substantial differences" are connected not with the shortcomings of the definition of the criterion itself, but with the lack of sufficiently clear explanations and recommendations in the standardized acts themselves, which led to errors in the practice of applying the laws. In the opinion of L. V. Chervova, precisely the criterion "substantial differences" in case of its proper interpretation and the consideration of the attainable positive impact reflects the creation nature of the solution, since the advantages, which are obtainable in case of the practical implementation of a technical decision, should be a new consequence of its differences.<sup>11</sup>

Along with the proposal on the increase of the "standard" of the domestic invention the idea of the legalization of a new, additional object in Soviet invention law is being advanced. Since the now prevailing uniform legal regime to some degree decreases the value of the category of an invention, it is proposed to develop a legal institution of the object, which will hold a place between the nonobvious (progressive) technical decision and the efficiency proposal, of which in general a modified form of already known means, methods and materials is the object. This new object is called different things: a minor invention or a useful model, a technical improvement.<sup>12</sup> In addition to the different names, fundamentally different means of its legal recognition are proposed: whereas some speak in favor of

the centralized consideration of applications by the forces of the system of the State Committee for Inventions and Discoveries,<sup>13</sup> others consider it advisable to relieve the organs of the State Committee for Inventions and Discoveries and to use for this purpose the central organs of sectorial management.<sup>14</sup>

The opposite opinion is also expressed in the literature: the idea of the legalization of such an intermediate object in Soviet invention law is deemed inadvisable, since these middle-level decisions in case of the increase of the demands on inventions should be transferred to the category of sectorial and intersectorial efficiency proposals.<sup>15</sup> The inadvisability of such an innovation is also stressed by other authors.<sup>16</sup>

The legal protection of middle-level technical decisions in practice is also possible on the basis of the prevailing legislation on the development of inventions. At present the institution of the efficiency proposal fulfills this function. If with respect to an application for a invention a decision on the refusal to issue a protective document for an invention has been given by the state scientific and technical commission of experts, the author can present this proposal as an efficiency proposal in the manner established by Section IV of the Statute on Discoveries, Inventions and Efficiency Proposals: by submitting the corresponding applications he can apply for the granting to his proposal of legal protection as an efficiency proposal either at one enterprise or in one or several sectors. Consequently, the prevailing legislation in general observes the constitutional principle of the all-round protection of the rights of innovators of technology, which is recorded in Article 47 of the USSR Constitution (Fundamental Law). Any technical decision, regardless of the rank of novelty and nonobviousness, can receive legal protection.

Therefore, bearing in mind the increase of the standard of the Soviet invention, which was already carried out by Order No 99 of 20 October 1982 and consists in imparting to the criterion "substantial differences" the content of the criterion "nonobviousness,"<sup>17</sup> as well as the need for the moral and material stimulation of the creators of middle-level technical decisions, we believe that it is necessary to pose the question as follows: Is a new institution of invention law needed for the legal recognition of these decisions or is the existing gradation of objects, which envisages a centralized system of the protection of inventions and a decentralized procedure of the encouragement of the initiative of efficiency experts, already sufficient?

All authors, who speak in favor of the distinction in Soviet invention law of the special institution of the useful model, in all likelihood, a priori consider such an act expedient, since they do not advance any arguments in favor of such an innovation. In reality this question is very diverse and depends on a large number of factors, which are closely interconnected in two basic aspects: a) in general the advisability of the development and introduction of the institution of the useful model; b) the legal regime of the new object. Due to the close connection of these aspects it is impossible to judge the advisability of the legal protection of the new object, without having specific views with respect to its legal regime.

First of all it is important to determine the place of the new object among the objects of invention law. It is quite clear that it should hold a place between the existing objects--the invention and the efficiency proposal. But since the latter can be of a different level--from the efficiency proposal of one enterprise to the intersectorial efficiency proposal, the foregoing should be clarified in the following manner: the demands, which are made on a new object, should be less than the demands, which are made on an invention, and at the same time a clear boundary between it and the intersectorial efficiency proposal should be defined.

What factors speak in favor of the legal isolation of such an object? It seems to us that first of all the social factor does. It is well known that not all people have identical creative abilities, including in the area of creative technical work. Some are capable of the development of nonobvious technical decisions (inventions), others are not. But they are quite capable of developing a technical decision of average or local importance. At the same time the aspiration for social activeness, as well as for the obtaining of social recognition for the results of their creative work is characteristic of all people. Therefore, we believe that for the stimulation of the social activeness of the Soviet people in the area of creative technical work the legalization of an additional object of legal protection should be deemed advisable. This gives the members of society the opportunity to approach in a more individualized manner the choice of the object of protection and gives the author the right to present his decision precisely within such administrative limits as he considers advisable.

It seems that the economic factor also testifies in favor of the legal separation of the useful model or the minor invention. For the development of technical progress it is important that every suitable and useful proposal would be placed at the disposal of society and that it would be accessible to all interested people. For the stimulation of the development, dissemination and introduction of middle-level technical decisions it is advisable to delimit them from efficiency proposals, the legal protection of which is connected with departmental limits and therefore, in case of more significant and important decisions, is not always optimal.

When considering the problem of the legal regime of a new object the question of the forms of its protection is brought to the forefront. In the literature<sup>18</sup> the idea is expressed that the author should have (by analogy with inventions) the right to choose between a protective document of the socialist type and a patent of exclusive right.

Such a traditional approach to the question under examination, in all likelihood, is dictated by the need to create the most favorable conditions for the legal equation on the international level of the protective document of the socialist type and the patent of exclusive right. But, on the other hand, this question should also be examined on the intrastate level.

The advisability of the introduction of precisely a socialist form of the protection of a new object, in our opinion, is indisputable, since it temporarily assigns to the state the exclusive right to the decision being

protected and guarantees the author social recognition, as well as material stimulation in case of the use of his proposal. Such a solution of the problem best meets the interests of both the state and the Soviet author: all Soviet state, cooperative and public enterprises, organizations and institutions will be able to use freely<sup>19</sup> the decisions being protected, on the basis of the advisability of their use under the production conditions of a specific enterprise, while the author is guaranteed adequate compensation.

A different situation is forming in the sphere of the patent protection of middle-level technical decisions. If traditional patents of exclusive right are issued for minor inventions, then, in all likelihood, the practice of the legal protection of these objects will repeat the practice which has formed in the sphere of the legal protection of inventions, namely: Soviet applicants will give preference to the authorship certificate<sup>20</sup> as the document which meets their interests more completely, while the overwhelming majority of foreign applicants will choose the patent protection of their developments. Consequently, in such a case foreign applicants will be able to obtain in the USSR the exclusive right to technical decisions which in the majority of cases are improvements which are minor as compared with inventions. But, on the other hand, the level of the demands, which are made on the object of protection, is far from always connected with the economic expedience of its use. Therefore it is quite possible that many middle-level technical decisions, for which patents are issued, from an economic point of view are of interest for Soviet enterprises and organizations. But if patents are issued in the USSR for these decisions, Soviet enterprises and organizations will not be able to directly use them. Hence it follows that for relatively negligible expenditures<sup>21</sup> foreign applicants can create for Soviet enterprises and organizations definite complications in the development and improvement of production.

Therefore it seems that in case of the development of the institution of the patent for a useful model two circumstances must be taken into account. First, the term of effect of a patent for a useful model should be significantly shorter than the term of effect of a patent for an invention. Second, the prohibitory function of the patent for a useful model should be modified. We see one of the possibilities for this in the lowering of the administrative level, which is necessary for the granting with respect to useful models of a compulsory license to interested enterprises and organizations.

The next important problem is the legal individualization of the middle-level technical decision as an object of legal protection, that is, the determination of its criteria of protectability. Many opinions are expressed in this regard in the literature. Although the very proposal on the introduction in the USSR of the legal protection of minor inventions has been made by many authors, only V. I. Blinnikov and V. N. Dement'yev took the path of expressing their proposal in concrete terms. Concerning the legal individualization of a new object, they regard as its essence the technical solution of a problem, while they suggest as the specific characteristics the following criteria: the relative novelty, the creative level and the utility.<sup>22</sup> In their opinion, the declared technical decision has relative novelty, if the information on it or on the decision identical to it has not

been published in the USSR (the spacing is ours--Ya. O.), and has a creative level if it was not obtained by a simple logical analysis or calculation. The utility is regarded by the indicated authors as the achievement of some positive impact as compared with the best objects of the given purpose, which are available in the USSR.

The proposals of V. I. Blinnikov and V. N. Dement'yev merit, undoubtedly, the most serious attention. However, with respect to the formulations developed by them it is also possible to express certain observations.

First of all the criterion of novelty arouses several objections. At the present level of the international exchange of information, when new developments, which have been devised in one country, are also becoming quickly well known in other countries, the determination of the novelty only in accordance with domestic publications<sup>23</sup> is inadvisable. In this case when determining the known level of technology (as applied to minor inventions) foreign publications, which have already become generally available in the USSR, will not be taken into account. This, in turn, can cause twofold consequences: first, it can create the prerequisites for the borrowing of decisions, which were published not in Soviet publications; second, the novelty, of which the ignorance of the decision in accordance with domestic publications is the measure, can lead to the dangerous approximation of the novelty of the new object to the novelty of a sectorial or intersectorial efficiency proposal.

Therefore we are of the opinion that the novelty in accordance with domestic publications is inadequate for the Soviet minor invention. In case of its legalization the demand of either world novelty or novelty within the USSR in accordance with all sources of publicity, including here also the information on the open use of the declared decision in the USSR (novelty in the USSR), can be made on the object of protection.

The criterion of world novelty in general requires the consideration of all publications, regardless of the place of their publication, as well as all the facts of the open use of the declared decision, regardless of where this use has occurred. This is absolute world novelty, and such a demand is made by the legislation on Soviet inventions.

Such a demand of novelty on minor inventions seems excessively strict to us. First of all among the circumstances, which discredit the novelty of a minor invention, one should exclude the use of an identical decision abroad as a fact, which lends itself with great difficulty to proof and which is not of practical importance during the appraisal.<sup>24</sup> Consequently, as applied to a new object a choice should be made between the relative world novelty (all publications, regardless of the place of their publication, and open use in the USSR) and novelty in the USSR (all publications, which are accessible in the USSR, and open use in the USSR).

It seems to us that preference should be given to the second version--the object being legalized should have novelty in the USSR. We see the bases for this in the following: first, in this case a distinct boundary will be legally created between the novelty of a minor invention and the sectorial

novelty of an efficiency proposal; second, the contrasting with the application for a minor invention of all the publications, which are accessible in the USSR, in practice guarantees the consideration of the world level of technology, since all important foreign publications are delivered to the USSR, but eliminates potential disputes and protects, which are based on the fact that a source, which really exists, but in practice is not accessible to the commission of experts, was not taken into account by the commission of experts.<sup>25</sup> Novelty in the USSR, in our opinion, is quite adequate for an object which in its essence is a rank lower than an invention.

The content of the criterion "creative level," which the above-mentioned authors incorporate in it, also raises certain doubts. For example, in their opinion, the decision, which has been declared as a minor invention, has a creative level, if in case of the choice of the material in the device or the raw material in the method the result attainable by the decision is based on u n k n o w n   p r o p e r t i e s (the spacing is ours--Ya. O.) of the material or raw material. Another statement of theirs is: a new ratio of the dimensions for a minor invention should not be derived by estimation, on the basis of known laws.<sup>26</sup> But this means that for the development of a minor invention, which in quality is always less than an invention, in the former case it is necessary first to discover the properties of a known material, which for the present are still unknown, and then to use these properties for the obtaining of a positive impact. In the latter case it is also necessary first to discover or develop a so far unknown law for the calculation, and then on the basis of this law to develop the technical decision.

Consequently, the content of the criterion "creative level," which is proposed by V. I. Blinnikov and V. N. Dement'yev, practically coincides with the content of the criterion "substantial differences," which at present has been legalized for the invention and signifies the requirement of nonobviousness. Therefore in case of the acceptance of this proposal the invention and the useful middle-level technical decision will be made equal according to the demands made on them in the area of creativity.

The foregoing does not at all imply that we deny the need for the inclusion in the legal concept of a minor invention of a criterion which makes it possible in the process of appraisal to evaluate objectively the creative nature of the declared technical decision. We recognize such a need without reserve, but the extent of this creativity cannot be equated with nonobviousness. We are of the opinion that for the qualitative evaluation of the creativity of the author of a minor invention the corresponding criterion should have the following standard content: the technical decision, which has been declared as a minor invention, has a creative level, if as compared with the closest known solution of the same problem (prototype) it contains a new set of significant attributes<sup>27</sup> (is new), while in turn the set of distinctive attributes or properties, which are imparted by this set to the declared decision, have not been revealed in other (except the prototype) known solutions of the same problem.

In case of such an approach to the definition of the criterion of creativity the following conditions will be met. First, this demand of creativity is less than the one made on inventions, when each distinctive feature or the

property, which is imparted by it to the declared decision, is studied separately for being known. Moreover, the group of solutions, which are compared when determining the creative nature of the declared decision, is limited to the known solutions of the same problem, while for inventions the group of solutions and knowledge, which are being compared, in practice is not limited. Second, such an extent of creativity is quite adequate to exclude from the legally protectable decisions such technical decisions which are based on the simple combination of two or more known decisions in accordance with known rules, on the addition to known decisions of additional known assemblies with the obtaining of a known result and so on, that is, decisions which in the literature it is customary to call the results of "ordinary designing."

On the basis of the foregoing we are of the opinion that in case of legalization it is advisable to define the useful model or the minor invention as a technical decision, which has novelty in the USSR in accordance with all sources of publicity, a creative level and utility.

The problem of the procedure of the legal recognition of a new object, that is, the choice between the centralized and decentralized systems of the examination of application materials, is also very interesting.<sup>28</sup>

The centralized examination of applications has many positive aspects: a uniform methodological approach to the material legal and procedural questions of appraisal, a uniform system of information on the decisions being protected, a uniform protective document, which is issued by an authoritative state department and ensures the extradepartmental protection of the rights of authors. But, on the other hand, the question of the total load (the applications for inventions and minor inventions) on the organs of appraisal of the State Committee for Inventions and Discoveries arises.

It seems that the number of applications for inventions will decrease, but this will be offset by the applications for minor inventions, and in the end the total number of applications, which require state appraisal, will even increase as against the current number. Therefore the total amount of work of the organs of appraisal will not decrease, inasmuch as the appraisal of a useful model will hardly be significantly shorter than the appraisal of an invention, since the basic work, which takes up the lion's share of time--the search for novelty, in the majority of cases will be carried out in practice in accordance with the same information collections.

The decentralized examination of applications will relieve considerably the system of the State Committee for Inventions and Discoveries, but a large additional load will lie on the central organs of sectorial management, for which the latter are not prepared. Both specialists and information collections are necessary for a high quality appraisal. It is more difficult to organize the uniform methodological supervision of this work. All this gives grounds to believe that at least at first the reliability of decentralized appraisal will remain at the level of the reliability of the appraisal of sectorial efficiency proposals.

On the basis of the above-cited analysis we believe that the choice should be made in favor of the centralized appraisal which is made by the forces of the State Committee for Inventions and Discoveries. The additional expenditures, which are necessary for the expansion of the organs of appraisal, in no case will exceed the expenditures on the establishment of a system of the decentralized examination of applications. The time factor also testifies in favor of this decision: the centralized system of appraisal owing to the available experience will operate immediately, the system of decentralized appraisal will require time for organization, during which the quality of appraisal is far from guaranteed. And what, in our opinion, is very important, centralized appraisal guarantees the reliability of the issued protective document and thereby ensures the validity of the rights of the author.

#### FOOTNOTES

1. Articles 15, 20 and 7 of "Konstitutsiya (Osnovnoy Zakon) Soyuza Sovetskikh Sotsialisticheskikh Respublik" [Constitution (Fundamental Law) of the Union of Soviet Socialist Republics], Moscow, 1977.
2. It seems that such a name of the law, which is used at present in the literature, is very conditional, since the traditionally established concept of the development of inventions does not encompass the development of new artistic design decisions (production prototypes), the establishment of previously unknown, objectively existing laws, properties and phenomena of the material world (discoveries), as well as the registration of drawings which are used for the labeling of goods (trademarks).
3. "The Statute on Discoveries, Inventions and Efficiency Proposals, Which Was Approved by Decree No 584 of the USSR Council of Ministers of 21 August 1973," "Otkrytiya, izobreteniya i ratsionalizatorskiye predlozheniya" [Discoveries, Inventions and Efficiency Proposals], Moscow, 1974, pp 5-41; "The Statute on Production Prototypes, Which Was Approved by Decree No 539 of the USSR Council of Ministers of 8 June 1981," VOPROSY IZOBRETATEL'STVA, No 10, 1981, pp 42-53; "The Statute on Trademarks, Which Was Approved by the USSR State Committee for Inventions and Discoveries on 8 January 1974," "Zakonodatel'stvo SSSR po izobretatel'stvu" [USSR Legislation on the Development of Inventions], Vol 3, Moscow, 1982, pp 305-320.
4. V. P. Mozolin, "Objects of Legal Regulation in the Area of Creative Scientific and Technical Work," "Tezisy dokladov i soobshcheniy vsesoyuznoy nauchno-prakticheskoy konferentsii 'Problemy sovershenstvovaniya izobretatel'skogo prava i razrabotka zakona ob izobretatel'stve v SSSR'" [The Heads of Papers and Reports of the All-Union Applied Science Conference "The Problems of the Improvement of Invention Law and the Drafting of a Law on the Development of Inventions in the USSR"], Moscow, 1980, pp 16-20.

5. N. K. Finkel' and G. I. Smirnov, "On the Question of the Legal Regulation of the Development of Inventions by a Special USSR Law," VOPROSY IZOBRETEL'STVA, No 12, 1979, pp 15-20.
6. V. I. Blinnikov and V. N. Dement'yev, "The Increase of the Demands on Inventions Under the Present Conditions of Scientific and Technical Progress," VOPROSY IZOBRETEL'STVA, No 8, 1980, pp 26-30.
7. V. I. Blinnikov and V. N. Dement'yev, "The Increase of the Demands on Inventions...," p 28. Although this statement of the authors directly applies to the authorship certificate, it is also equally possible to extend it to the patent, inasmuch as the material legal demands, which are made on inventions, are invariant with respect to the protective document.
8. V. P. Mozolin, "On the Objects of Legal Regulation in the Area of Creative Scientific and Technical and Artistic Technical Work in the USSR," VOPROSY IZOBRETEL'STVA, No 8, 1980, p 19; I. E. Mamiofa, "The 'Minor Invention': Problems of Recognition and Protection," "Praktika izobretatel'skoy i patentno-litsenzionnoy raboty" [The Practice of Inventing and Patent and License Work], Leningrad, 1982, p 9; V. I. Blinnikov and V. N. Dement'yev, "The Increase of the Demands on Inventions...," p 27; N. K. Finkel' and G. I. Smirnov, "On the Question of the Legal Regulation...," p 17.
9. V. I. Blinnikov and V. N. Dement'yev, "The Increase of the Demands on Inventions...," p 28; V. P. Mozolin, "On the Question of the Legal Regulation...," p 20.
10. L. V. Chervova, "Substantial Differences Are a Criterion of the Evaluation of the Creative Nature of Inventions," "Tezisy dokladov i soobshcheniy...," p 65.
11. It seems that in many ways this dispute was resolved by Order 99 of the USSR State Committee for Inventions and Discoveries (Goskomizobreteniy) of 20 October 1983, by which the changes and additions to the Instructions on the State Scientific and Technical Appraisal of Inventions (EZ-2-74) were approved. VOPROSY IZOBRETEL'STVA, No 3, 1983, pp 59-62. In light of these changes and additions the criterion "substantial differences" acquired a content, which in principle coincides with the generally accepted content of the criterion "nonobviousness."
12. N. K. Finkel' and G. I. Smirnov, "On the Question of the Legal Regulation...," p 18.
13. V. I. Blinnikov and V. N. Dement'yev, "On the Increase of the Demands on Inventions...," p 29.
14. N. K. Finkel' and G. I. Smirnov, "On the Question of the Legal Regulation...," p 18.

15. V. P. Mozolin, "On the Objects... Work in the USSR," p 20. It seems that the author quite validly indicates the difficulties in the distinction of useful models and individual categories of efficiency proposals.
16. I. E. Mamiofa, "The 'Minor Invention'....," p 12.
17. "The Changes and Additions to the Instructions on the State Scientific and Technical Appraisal of Inventions (EZ-2-74)," VOPROSY IZOBRETATEL'STVA, No 3, 1983, pp 59-62.
18. V. I. Blinnikov and V. N. Dement'yev, "The Increase of the Demands on Inventions....," p 29.
19. By free use we understand such use, when the holder of a protective document does not have the right to prohibit the use of the protected decision by interested organizations. This far from implies that the corresponding experience of foreign socialist countries cannot be used in the future, in case of the improvement of the legal regulation of the use of protected decisions.
20. We do not rule out the possibility that this protective document will be given a different name, but the exclusive right of the state to the protected decision and the granting to the author of a set of nonexclusive rights should be its essence.
21. The duties for the patenting of minor inventions, of course, should be less than the duties for the patenting of "genuine inventions."
22. V. I. Blinnikov and V. N. Dement'yev, "The Increase of the Demands on Inventions....," p 29.
23. Such a conclusion follows directly from the phrase "...published in the USSR," since the result of publishing activity is meant by a publication.
24. The practice of the state scientific and technical appraisal of inventions attests that the instances of the deviation of applications for an invention with reference to the use of an identical decision outside the USSR are very rare.
25. A similar dispute is quite possible in case of world novelty.
26. V. I. Blinnikov and V. N. Dement'yev, "The Increase of the Demands on Inventions....," p 29.
27. By a set of significant attributes one should understand a set of both known and new (as compared with the prototype) significant attributes, while the set should be recognized as new in the following cases: a) new attributes have been added to the prototype; b) an attribute of the prototype has been replaced by a nonequivalent attribute; c) a new combination, which is based only on the attributes of the prototype, has been created.

28. When examining this question we regard as already proven the inadvisability of the introduction in the USSR of a secret system of the issuing of protective documents for useful models. We see confirmation of this, in particular, in the fact that such a proposal has not even been advanced in the literature.

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## **GREATER EFFICIENCY NEEDED IN RESEARCH, DEVELOPMENT**

Riga KOMMUNIST SOVETSKOY LATVII in Russian No 4, Apr 84 pp 56-61

[Article by O. Anfimov, second secretary of the Riga City Committee of the Latvian Communist Party: "Improve the Performance of Scientific Research and Planning and Design Organizations"]

[Text] The successful accomplishment of the tasks set at the 26th CPSU Congress for enhancing the effectiveness of public production and putting the national economy onto the path of intensive development is closely linked with the acceleration of scientific and technological progress and with the extensive application of scientific and technological achievements in production. "It is absolutely essential," General Secretary of the CPSU Central Committee K.Yu. Chernenko underscored at a meeting with the electors of Moscow's Kuybyshev Electoral District, "for us to provide for the rapid and continuous renewal of all sectors of the national economy with the modern achievements of science and technology. This is one of our basic tasks. Without this progress for the society is simply inconceivable."

The party has assigned us the task of setting up the production of machinery, equipment, instruments and materials conforming to the latest achievements of modern science and technology, significantly increasing labor productivity in all sectors of the national economy and ultimately, raising our society's productive forces up to a qualitatively new level in the years immediately ahead.

In order to accomplish this task we must raise the level and increase the results of the work performed by all scientific research and planning and design organizations, and focus their efforts on the resolution of major problems of scientific and technological progress.

These matters are always at the center of attention of the Riga party organization. They are included in the long-range and current work plans of the party gorkom and raykoms and primary party organizations, and are brought up for discussion by the buro and plenums. A March 1982 plenum of the party gorkom, for example, discussed the city party organization's tasks with respect to accelerating the application of scientific and technological achievements in industry and making the work of scientific research institutes and design offices more effective.

The process of developing and introducing new and more effective equipment and technology and questions having to do with coordinating the activities of enterprises and various organizations in this area are regularly discussed by economic and social development councils set up in the party gorkom and raykoms. A party council set up under the gorkom also deals with questions of coordinating the work performed by party and soviet organs, party and public organizations, and managers of enterprises and organizations in the city to accelerate scientific and technological progress in industry in the republic's capital.

Many primary party organizations have commissions for monitoring the performance of administrative bodies with respect to adopting new technology and improving product quality. Methods centers and offices have been set up in the party raykoms, where information on the most important directions for improving the technological level of production is accumulated and summarized.

The party organizations constantly seek ways to create the conditions necessary for accelerating and enlarging the scope of scientific and technological progress and enhancing effectiveness in the work of scientific research and planning and design establishments. Their labor productivity has improved considerably, the amount of research and development performed by them has grown, and the economic effect from the adoption of innovations provided by the scientists and designers has increased in recent years.

Institutes of the Latvian SSR Academy of Sciences and many specialized planning and design offices are performing a great deal of work to accelerate scientific and technological progress in the national economy.

The first years of the current five-year period have been marked by further growth in the number of developments from institutes of the Latvian SSR Academy of Sciences to be applied. More than 400 developments from the scientists were applied in the national economy during the period 1981-1983, 140 of which were incorporated at Riga enterprises. The number of developments to be applied is increasing every year. An average of 93 developments produced by scientists of the Latvian SSR Academy of Sciences were applied annually during the past five-year period, and a total of 147 of their developments were put to use in 1983.

The volume of projects carried out by scientific research institutes under economic contract is constantly growing. It amounted to 5.2 million rubles in 1983. The scientists have fulfilled 748 economic contracts totalling more than 16 million rubles since the beginning of this five-year period.

Institutes of our republic's academy of sciences fulfill more than 500 contracts for scientific and technological collaboration each year, more than 80 of which are concluded with Riga's enterprises and establishments. Workers with institutes of the Latvian SSR Academy of Sciences have developed a number of new materials and experimental units. Specifically, the Inorganic Chemistry Institute has significantly increased its research into plasma technology under a contract for scientific and technological collaboration and has produced non-standard equipment for obtaining new high-melting compounds in the form of ultra-dispersed powders. A total of 1.1 million rubles have been saved from the use of these materials at Riga Enterprises. A special cutting tool developed by the scientists is being successfully used in production associations of the State Electrical Engineering Plant imeni V.I. Lenin, at the Riga Experimental Production Plant and other enterprises.

The Polymer Mechanics Institute for the Furniture Industry developed the semi-rigid polyurethane foam Latan. Furniture parts are being made of it at the Gauja LPNO [expansion unknown]. The use of polyurethane foam in 10,000 sets of furniture saved 270 cubic meters of lumber.

Under an order from Riga's gorispolkom, the Physics and Power Engineering Institute has begun an extensive group of projects to install an automated heat control system at subscription centers of residential buildings, which produces a fuel saving of 20-25 percent.

Design offices of the city of Riga also have many valuable developments to their credit. Among others, we should mention the purposive work performed by the Special Design Office for the Adoption of Chemical Methods (SKBKh). This office has close ties with 16 of our branch's enterprises, which produce items in aerosol packaging. The office's main tasks are to develop new aerosol preparations and the technology for producing them, to design and produce new models of equipment and technological gear for the production of aerosol packaging and to find new types of raw materials, and a number of other technical and economic tasks of the subbranch.

This organization is increasing its work volume by the year, and it also has good economic indices for its work. Last year the economic affect from each ruble spent on the adoption of design developments amounted to 3.38 rubles. Technological equipment manufactured by the SKBKh during the current 5-year period for producing propellant-free (bespropellentnyy) aerosol packaging produced a saving of more than 0.5 million rubles at the Latvbytkhim Production Association. More than 400,000 rubles worth of raw materials has been saved during the first 3 years of the current five-year plan from the adoption of SKBKh developments at this association alone.

The Central Planning and Design Office of Mechanization and Automation is also constantly improving its performance. It is the leading organization in the field of instrument making. The development of new technology and organization for tool production, the designing of special metal-working equipment and the development of technology for electro-physico-chemical processing and the robotization of production are its main areas of work.

In 1983 the design office developed twelve new kinds of special production equipment and introduced twelve promising processes and 39 units of new equipment, including 22 units of automatic or semiautomatic equipment, at 79 enterprises. The economic effect from the adoption of these developments amounted to more than 4.5 million rubles, which considerably exceeded the plan assignment.

All of the work performed by party organizations, managers and labor teams of the scientific research institutes, planning and design offices to accelerate application of the achievements of scientific and technological progress helped to successfully accomplish the task of setting outstripping rates of increase for labor productivity, compared with rates of growth for production volume, in the city's industry. This is especially important in Riga's situation of an acute labor shortage.

Possibilities for further enhancing effectiveness in the performance of scientific research institutes and planning and design offices have certainly not yet been exhausted, however. The main ones include thoroughly concentrating efforts and funds on accelerating the intensification of production and raising it to a qualitatively new level, and making more complete use of the large scientific and technical capability created in Riga.

It must be noted that the effectiveness of the work of a number of scientific, planning and design and technological organizations still does not fully measure up to modern requirements. The level of scientific research and planning and design projects is still low at many of them, their adoption produces an insignificant economic effect and it takes a long time to develop and master the new equipment and technology. This applies particularly to the Latvian Scientific Research Institute of Light Industry, the Central Technological Planning and Design Office of the Latvian SSR Ministry of the Meat and Dairy Industry, the Orbita Design Office and certain other scientific research institutes and design offices. Many of the tools, equipment and consumer goods developed by them are inferior in technical characteristics and quality to the best Soviet and foreign models, and they are producing serious complaints from the consumers.

The main reserve for enhancing the operating effectiveness of scientific research institutes and planning and design offices lies in overcoming stagnant thinking and the inability and sometimes, a disinclination, to seek new and different ways of accomplishing the tasks on the part of certain managers and specialists.

The June 1983 Plenum of the CPSU Central Committee set the task of developing a system of organizational, economic and moral measures, which would provide both management and the workers--and the scientists and designers, of course--with an incentive to renew the equipment, and would make it unprofitable to continue operating in the old manner.

Many factors contribute to the operating effectiveness of scientific institutions and design offices: selection of the correct goals and directions in the research work, the elimination of individual, minor projects, the provision of modern equipment and instruments for the scientists and engineers, the achievement of close linkage between science and production, a clearly defined orientation for the research and development toward the creation of technological innovations bringing maximum conservation of public labor, the achievement of a significant increase in labor productivity, and many others.

A great deal must be done to build up the testing and experimental base of the scientific research institutes and design offices and in many cases, to create such bases. The Central Technological Planning and Design Office of the Latvian SSR Ministry of the Meat and Dairy Industry and the Special Design Bureau for the Adoption of Chemical Methods, among others, lack their own testing and experimental base. There are no substantial experimental and testing production facilities for a number of scientific institutions of the republic's academy of sciences.

It is therefore especially important to make thrifty use of the existing bases and to avoid loading the capacities with series-produced items and projects not directly related to the specific institution's research and design work.

We must completely resolve the problem of making efficient use of the existing control and measurement equipment, especially the expensive instruments and computers. We feel that we should establish more branch and interbranch rental facilities and centers for using this equipment on a shared basis, and step up control over its acquisition by enterprises and organizations. It is probably not practical to have such independent establishments as the Latvian Main Division of the Specialized Design Office for Automated Control Systems of the USSR Meat and Dairy Industry. It has a staff of around 100 people, the economic effect from whose work does not repay the investment.

Extensive possibilities for enhancing the operating effectiveness of scientific, planning and design institutes are contained in the improvement of the organization of the work performed by their personnel and the labor incentive system, in the creation of efficient organizational structures based on the correct combination of labor division and labor cooperation in accordance with the objectives of the research and development. This can also be achieved by determining the optimal number of workers in each subdivision, conserving their work time by improving the technology used for performing these jobs, making maximum use of progressive methods, instruments, automation means and office machines, and by determining the optimal ratio of the numbers of workers in the various specialities and skills levels.

We know that scientific and technical progress begins with a plan. The plans developed by our planning and design organizations, however, frequently lack an in-depth analysis of the production technology and organization and contain no proposals for radically improving them. The small specific portion of large-scale projects for resolving basic production problems and drastically increasing labor productivity in the list of subjects dealt with by the planning institutes is one of the main causes of this situation.

We need to take a very serious look at the feasibility of having small organizations and branches of a number of All-Union institutions in Riga with staffs of a few dozen workers and not realistically capable of resolving large-scale national economic problems. Their subjects are of little significance and are secondary in most cases. These include the Riga Division of the Northwest Branch of the All-Union Technological Planning Institute for the Construction of Transportation Facilities (VPTItransstroy), which has a staff of 23, Riga Division of the Introduction Office of the Central Scientific Research and Experimental Design Institute for Organization, Mechanization and Technical Assistance for Construction (TsNIIOMTP) of the USSR Gosstroy, which has a staff of 28.

We must also establish order in the organizational structure and the manning tables of scientific research institutes and planning and design offices. Small subdivisions exist and are still being created in them, and this artificially inflates personnel needs. The positions of manager, deputy manager, two chief specialists and five section chiefs have been created at the aforementioned Riga division of the TsNIIOMTP office of the USSR Gosstroy. This is too many positions for such a small team of workers.

The party raykoms and the primary party organizations should exhibit greater principle and bring to full party accountability those managers who are not fulfilling the demands set by the party and the government with respect to the efficient use of personnel.

The social and economic importance of wages and the system of material incentives for highly productive work should not be underestimated. There are still numerous unresolved problems in this area. An economic experiment underway in Leningrad focuses on finding ways to resolve them. It essentially involves increasing the responsibility of the designers, the production engineers and other engineering and technical workers for raising the technical level and the quality of their development projects on the basis of improved wages and increased material incentive to perform more work with a smaller personnel. The results of the Leningrad experiment should also be the object of concerned study by the leaders of Riga's scientific research and planning and design offices.

The work of concentrating and specializing production and linking it with science is becoming increasingly important today. The creation of scientific production complexes based on the Al'fa association, which include researchers, designers and production workers, is proving to be highly effective.

Those designers working in production itself also have many interesting developments to their credit. The "Rizhskiy elektromashinostroitel'nyy zavod" production association and the illumination engineering and electric-light plants, as well as a pilot plant for the production of means of mechanization, among others, are performing a great deal of work to reduce production outlays, making extensive use of cost-function analysis for this purpose. It involves a constant search for ways to reduce the materials-, energy- and labor-intensiveness of the items produced by perfecting the designs and the procedures used for manufacturing the parts and assemblies, by making them more durable and increasing their service life. The correct application of this method makes it possible to reduce the basic cost of items by 20-30 percent. It should be carefully studied by the city's other enterprises and organizations.

Success in enhancing the effectiveness of the national economy depends in great part on the extensive adoption of systems for automating the planning, design and technological jobs and production control. This task cannot be accomplished without significantly increasing the training of specialists for automated planning and control of the production processes. This is a problem which our VUZ's must begin working on without delay.

In order to significantly enhance the effectiveness of scientific and planning and design development projects, every director of a scientific research or a planning and design institution and every specialist must achieve the maximum results from his work and demonstrate initiative and persistence. The party organizations in turn must thoroughly and extensively study the efficiency of directors and specialists and hold the idlers strictly accountable. We must critically assess the results from each team's work, increase the responsibility of the personnel for their assigned job and strengthen socialist labor discipline.

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TALLINN ELECTRICAL EQUIPMENT INSTITUTE PROFILED

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[Article by E. Ivanov, secretary of the party organization of the scientific research institute of the Tallinskiy elektrotekhnicheskiy zavod imeni M. I. Kalinina Production Association, and Candidate of Technical Sciences A. Khybemyagi, chief of the Department of the Technology of Machine Building of the scientific research institute: "On the Front Line of Scientific and Technical Progress"]

[Text] Recently the scientific research institute of the Tallinskiy elektrotekhnicheskiy zavod imeni M. I. Kalinina Production Association celebrated its 20th anniversary. Of course, this is not yet a jubilee, but it is already possible to look at the institute as a mature collective, which is capable under the supervision of the party organization of accomplishing important practical scientific problems.

What constitutes the content of our work? It is possible to reveal it in brief in the following manner. As is known, a significant portion of electric power is consumed not directly in the network, but in converted form. For example, a large amount of welding operations and rail transportation is carried out using direct current, a number of technological processes in machine building require currents of increased frequency and so on. In the national economy the demand for various transformer units, of which semiconductor power devices are the core, is steadily increasing. The production of these instruments and devices is concentrated in one of the sectors of the electrical equipment industry, of which specialized plants and scientific research institutes are a part. In our republic the sector is represented by the Tallinskiy elektrotekhnicheskiy zavod imeni M. I. Kalinina Production Association and its institute.

The development of high-speed semiconductor power devices is the basic direction of the activity of the institute. The automated designing of semiconductor power devices and the development of equipment for measurements and tests of semifinished products and finished devices are closely associated with this. In this area, as in the area of data processing systems with the use of computer equipment, the institute is the main one in the subsector. Within the entire sector it is the main one in two directions: the technology

and equipment of cold extrusion and the stamping of sheets of the magnetic circuits of electric machines with the use of hard alloy dies.

In recent years on the initiative of the communists particular attention has been devoted to the increase of the efficiency of the work of the institute. Communist G. Toomsoo, deputy director for scientific work, coordinates the corresponding activity. The party buro systematically listens to and exactingly discusses the reports of the chiefs of the departments and the party group organizers.

To execute the well-known decree of the CPSU Central Committee and the USSR Council of Ministers "On Improving Planning and Strengthening the Influence of the Economic Mechanism on Increasing Production Efficiency and Work Quality" scientific and technical measures were implemented at the institute for the purpose of increasing the economic efficiency. The development of new technology and new items is carried out on the basis of supply orders, which envisage the introduction of the equipment, which was developed at our scientific research institute, at enterprises with the participation of workers of the institute. The economic impact of this work at the enterprise is expressed as the profit from the decrease of the production cost as a result of the introduction of new technological processes and equipment or as a price markup in case of the introduction of new items.

The work of the institute is evaluated according to the end result, that is, on the basis of the economic impact actually realized at the enterprise, in conformity with which the enterprise transfers to the account of the scientific research institute a portion of the assets from its stimulation funds. At the institute these assets are used for the material stimulation of the performers of the work and auxiliary services, as well as for the creation of a fund for sociocultural measures. Thereby a direct connection between the end result and the material stimulation of the developers is ensured, which increases their interest in the quickest possible and efficient introduction of scientific achievements and stimulates active creative research. This is a precise and fair, although somewhat rigid system, which requires developed economic thinking from each person.

When introducing the system the party organization acted comprehensively and systematically, with allowance made for the need to rearrange both organizational and educational work. For example, the increase of the level of economic knowledge of all categories of staff members was envisaged in the plans of party and economic training. The Bureau for Economic Education under the supervision of K. Iokhannes, chief engineer of the scientific research institute, when organizing the lessons concentrated attention on the practical tasks facing the collective. Special lessons on the methods of value engineering, and in recent times lessons on the new procedure of planning, financing and stimulation, which was introduced as of 1 January of this year in connection with the experiment on the improvement of the economic mechanism in the system of the USSR Ministry of the Electrical Equipment Industry, were held. Moreover, conferences of the managers of the subdivisions, which are devoted to questions of work efficiency, are held regularly in the office of O. Terno, director of the scientific research institute. Decisions are made

on the basis of the discussions, at the same time the implementation of previous decisions is monitored.

The system of institute socialist competition serves the interests of the increase of the efficiency of scientific work. In all 47 indicators of the activity of the scientific departments are taken into account. Those who achieve significant results, fulfill the socialist obligations and observe financial discipline are in a preferential position. But this does not mean that it is possible to win first place by having good indicators for only several basic items. The principle of comprehensiveness is in effect when tallying the results. The Department of the Technology of Machine Building and the Laboratory of Diffusion Welding gained a well-deserved victory in the socialist competition for the worthy greeting of the 66th anniversary of Great October. Ye. Kruus, a woman worker of the latter, was recognized as the best junior scientific associate of the institute.

At the same time it should be admitted that the organization of socialist competition in the collective needs further improvement. First of all this stems from the introduction of a system of new indicators within the economic experiment. For example, the number of conditionally freed workers in production and others should be taken into account.

Thus, rather good results were achieved by the joint efforts of the management and the party organization. Whereas in 1981 the economic impact from the introduction of institute developments came to 626,000 rubles, in 1982 it came to 3.24 million rubles and last year to 3.44 million rubles.

The commission for the monitoring of the activity of the administration, which has been set up in the party organization, is also called upon to promote the increase of the efficiency of scientific work. Candidate of Technical Sciences Ye. Khutoryanskiy is in charge of it for the third year. At present it is analyzing the activity of the scientific departments on the increase of the efficiency of development. There is no doubt that positive results will also be achieved here. For E. Galinskiy, Ye. Plotnikov, G. Ashkinazi, R. Kyuts and others, who are members of the commission, have shown themselves to be principled communists and highly skilled specialists. In recent years the nature of the activity of the commission has changed. It had to deal 2 to 3 years ago primarily with questions which concern basic scientific work and organizational problems of the increase of efficiency, now, when these questions are already being settled, much attention is being devoted to the work of auxiliary services and the effectiveness of the use of fixed capital.

The commission reacts severely to identified oversights. For example, it studied in detail the situation in the experimental production section, the production capacity of which does not correspond to the increasing needs of the scientific departments and is hindering the accomplishment of the assignments which have been included in the thematic plan. It was established that the wage of the workers of the section is not properly dependent on the results of their labor, too few technical and technological innovations are being introduced and so on. The party buro examined the suggestions of the commission. In particular, the need in the interests of the acceleration of the introduction of institute developments to develop systematically the

experimental production section is noted in the decision which was adopted by it.

Or there is another example. The commission studied such a question as the conformity of the plan assignments to the production areas of the scientific departments. The suggestions of the commission were submitted to the meeting of the party buro and the meeting of the party and economic aktiv of the institute. The latter adopted the decision to formulate the basic tasks of the scientific research institute for 1984-1990 and measures for their fulfillment, including plans of the retooling of the departments.

Last year our party organization aimed the main efforts at the assurance of the fulfillment by the collective of stepped-up socialist obligations. Of them three points--to produce high-frequency measurers of specific resistance and contactless measurers of the thickness of silicon plates for semiconductor production, to introduce the diffusion welding of rectifying components--were included in the socialist obligations of the working people of the Estonian SSR. This placed great responsibility on the party organization, especially in the setting up of efficient monitoring of execution. With respect to all the points of the obligations of the collective the responsible individuals were appointed and specific deadlines were established. For the accomplishment of the republic obligations the party buro approved stage-by-stage schedules which are easily monitored. When in the case of a regular check it was found that the fulfillment of one of the points was threatened with failure, the party buro immediately studied the causes of the formed situation and took the necessary steps, including organizational steps. As a result the collective was able to report already in October the accomplishment of the republic socialist obligations, while by the 66th anniversary of the October Revolution it had also coped with the institute obligations.

Let us examine in a little more detail the fulfillment of the last of the above-mentioned points of the republic socialist obligations.

Diffusion welding is one of the fundamentally new technological processes, the extensive use of which in machine building, electrical engineering, instrument making and a number of other sectors is making it possible to realize new designs of equipment, accessories and instruments and to obtain a significant saving of manpower, materials and electric power. It is a question of the process of welding, in case of which the uniting of parts made from any metallic materials takes place in the so-called solid phase. The UDS-3 diffusion welding equipment, which is used at approximately 10 electrical machine building plants of the country for uniting hard alloys and steel, was developed on the basis of the abundant experience of the specialists of our institute.

The new generation of this equipment--the UDS-5 automated diffusion welding complexes, which are original in design and the principle of operation--is designed for the obtaining of diffusion joints in power semiconductor materials. Its way into production was briefly the following: from modest experiments to trial series, further to the production of a pilot industrial plant and the solution of practical problems at the Saransk Elektrovypyramitel' Plant. Then a second plant, the tests of which were

initially conducted at the institute under laboratory conditions, and latter at the Tallinskiy elektrotekhnicheskiy zavod imeni M. I. Kalinina Association in case of the mass production of power diodes and thyristors, was produced. At the end of the period, which was extremely intense for the Laboratory of Diffusion Welding, the complicated welding complex was accepted and deemed introduced 2 months ahead of the deadline which was envisaged in the republic obligations.

By the end of the year the number of diodes, which were welding at the association on the new complex, came to 20,000. The substantial improvement of the quality and many electrical engineering parameters of semiconductor power devices is yielding a large saving of materials and living labor, the anticipated annual economic impact comes to 114,000 rubles. The installation of the second diffusion welding complex for the parent plant of the association is now under way.

The basic load in this work rest on the collectives of the Laboratory of Diffusion Welding headed by Candidate of Technical Sciences Ye. Khutoryanskiy and of the experimental production section. The work was characterized by a creative search (several authorship certificates were received, one of them is being patented), by the genuine enthusiasm of the performers and their aspiration to cope well with the assigned job.

The mobilizing and inspiring role of the party group of the department and its exacting attitude toward the members of its own collective and the other subdivisions of the scientific research institute were felt in all this. Design engineer L. Stepanova, the party group organizer of the department, who directly participated in the development of the new complex, was always well informed about all the design, technical and introducing problems. At the same time, by knowing all the members of the collective and their strong and weak points, she was able to give effective support to the leading specialists of the laboratory in their work in people, to combine together the efforts of scientists and engineers, technicians and laboratory workers, welders and adjusters, lathe operators and electricians--people with a different education and experience, of a different age and nationality--and to aim them at the achievement of a common goal--to turn over the welding complex as equipment with a high degree of plant readiness. Indeed, the entire process from the installation to the start-up of the automated welding complex made up of several tens of units with a complex control system did without it being required to significantly change or modify anything in it.

Such a result, as has already been stressed, was achieved by joint conscientious labor. It is difficult to single out anyone. But of those who were in the most responsible sections it is impossible not to name Honored Engineer of the Estonian SSR and veteran of the Great Patriotic War E. Galinskiy, a communist with a length of service of more than 30 years. He uses his abundant life and labor experience, which is supported by the experience of many years of public activity, when solving not only complex technical problems, but also educational and ethical questions. His great party exactingness and sense of tact appear in everything.

What was related above is only one example of the implementation of an institute development with a high degree of plant readiness at the parent enterprise of our production association. The system of final tests of power thyristors, which was introduced in production last year and in which 10 very complex operations and all the auxiliary operations, including the drawing up of records of the results of the tests, have been automated, is unique in the level of automation. As a result a significant saving of manpower and an anticipated annual economic impact in the amount of 348,000 rubles are being achieved.

The communists, who are scientists and engineers of the Automation Department headed by Candidate of Technical Sciences R. Kyuts, chief of the department, made a considerable contribution to the development of this unit.

This year and in preceding years another series of new, nonstandard technological processes and types of equipment: machines for the hermetic sealing of electrical items, a section for the production of polymeric insulators, a technology and dies for cold extrusion, which make it possible to save hundreds of tons of nonferrous metals, was developed at the institute and was introduced at the parent plant of the association.

In 1983 alone 17 highly durable hard alloy dies, which yield a large economic impact, were introduced at the Vol'ta Plant and other electrical machine building plants.

The party group of the Department of Hard Alloy Dies headed by laboratory chief E. Kuks contributed in many ways to the success of these developments. Honored Engineer of the Estonian SSR L. Kaazik, deputy chief of the department, leading specialists A. Yur'yev and S. Statsenko, Ye. Plotnikov, an instrumentation mechanic, and other members of the party group also worked vigorously.

The introduction of the results of the mentioned research and technological developments and others, which were performed at the institute, at enterprises of both our and other republics revealed three main common aspects of this work:

the process of introduction in recent years has sped up;

primarily technological equipment with a high degree of plant readiness is being introduced;

the efficiency of the work of the institute as a whole has increased.

All this is pleasing, especially if one considers the tasks which were posed in the decree of the CPSU Central Committee and the USSR Council of Ministers "On Measures on the Acceleration of Scientific and Technical Progress in the National Economy." Next let us examine the practical experience of the achievement of the indicators of the implementation of our developments as a result of the cooperation of the institute and plants.

The significant acceleration of the development, production and introduction of new technological equipment was promoted by:

the use of computer equipment for the purpose of expediting technological, design and development work;

the partial combining of the cycles of the designing and production of equipment;

the partial production of technological equipment by the forces of the plant, at which it is being introduced (the present capacity of the experimental production section of our scientific research institute does not completely meet the needs of the scientific departments); the joint installation of the equipment at the plant;

the selection of capable workers and their comparatively earlier instruction in the methods of work on the new institute equipment; the creation for them of morally and materially favorable working conditions;

a practical, creative, resourceful attitude toward the matter of the workers of the institute and the introducing plant; the purposeful formation of such an attitude in the party groups of the departments.

Of course, in practice even in general successful introducing work cannot do without minor, and at times also significant difficulties. Unexpected changes in the plan assignments of the enterprise, prestigious orders, the unbalance of the plans and the production engineering possibilities of the institute and the plant and discrepancies in case of the coordination of the calculations of the economic efficiency and the stimulation of the developers are responsible for them.

The present supply system, when the time from the orders to the realization of assets comes to 1-2 years, is not coordinated with the time of the development of modern equipment (2-2.5 years) and greatly complicates the acquisition of materials and components for the new apparatus and equipment, which is being developed at the institute. Much here is changing for the better, but the extension to the system of the USSR Ministry of the Electrical Equipment Industry of the experiment being conducted by the USSR State Committee of Material and Technical Supply, in conformity with which the times of deliveries in case of the material and technical supply of institutes and special design bureaus are being shortened from 1-2 years to 2-3 months, should especially be expedited. The production of new components, parts, assemblies, units and so forth must also be organized better, the corresponding catalogues must be published promptly and disseminated extensively.

Everything said above concerns the production relations outside the sphere of activity of our institute. Undoubtedly, many opportunities to expedite introducing operations exist, and the collective of the institute is trying to devote the maximum energies to this. At the same time we are also awaiting the solution of problems which do not depend on us.

If we evaluate the level of plant readiness of the technological equipment, which has been developed at the scientific research institute of the Tallinskiy elektrotekhnicheskiy zavod imeni M. I. Kalinina Association, in case of a self-critical approach it is possible to note nearly 100-percent assimilation (if we call a one-time activity--the start-up of the equipment--**introduction** and its many years of practical use under production conditions **assimilation**). Indeed, the semi-automatic machine for rotary extrusion has been operating for two decades now at the Tartu Shop of the Vazar Production Association, machines for the hermetic sealing of electrical items have been in operation at the parent plant of the Tallinskiy elektrotekhnicheskiy zavod imeni M. I. Kalinina Association and other enterprises for 5-15 years, diffusion welding equipment--in the range of 12 years and so on. Here the institute periodically carries out the modernization of these machines.

Thus, the development of technological equipment, apparatus and accessories, which are ready for assimilation, and their comparatively rapid introduction and assimilation with the aim of long-term operation have become a good tradition of the collective of our scientific research institute. With respect to its quality, readiness for assimilation and reliability our equipment gained long ago a good reputation in the system of the USSR Ministry of the Electrical Equipment Industry and outside it.

What promoted the increase of the level of plant readiness of the equipment, which was developed and produced at the institute?

First, the equipment, which has been delivered from the institute to the plant, is installed and adjusted by way of so-called contract supervision, by the forces of the institute and the laboratory, which for the most part developed the equipment, and with the assistance of the corresponding services of the enterprise. The plant readiness of the equipment is checked in production, at first by the preparation of pilot batches of products, then at the stage of pilot operation, further, after the statistical analysis of the obtained data, the checking of the quality and the making of the necessary adjustments, the equipment is turned over for production. All this work is performed jointly by specialists of the institute and the enterprise.

Second, the optimum internal structure of the subdivisions and the ties between them, which formed over the decades and conform to the tasks of the institute, as well as the business-like relations between workers of all categories helped to increase the degree of readiness of the equipment for assimilation. These structural ties and relations presume the fulfillment by subdivisions which are stable in composition (the laboratory, a group of laboratories, a department) of the entire cycle of operations from the idea to introduction. Relatively small collectives conduct technological research, determine the initial parameters, make a model of, design and produce the pilot and commercial unit and so on. The process engineer takes part in the work of the designer, the designer takes part in the production of the equipment, while both of them together with scientists take part in the testing and introducing operations. Such a system, although it is not the most productive, eliminates almost completely the defects in engineering labor and connects scientific ideas, proposals, versions and results directly with

their practical implementation, owing to which the expenditures on the critical analysis of impracticable decisions are eliminated.

Such a form of work, which unites scientists, engineers and workers into one "brigade," is akin to the brigade contract. Indeed, the majority of conditions which ensure the effectiveness of brigade labor--the spatial unity of the workplaces, the production and technological completeness of the assignments, the great mobility of the organization of labor, the reflection in the remuneration of labor of the individual (wage) and collective (bonus) aspects, the brigade scale of the number of workers (10-20) and so on--are present in laboratory work.

Since the object of the personal labor of each worker is not transferred from the laboratory to another subdivision, but remains on site and should begin to operate in front of the members of the collective, errors are found quickly, it is easy to eliminate them, the material harm is minimal, while the moral responsibility of everyone is very high. Individual and collective creative work also plays a significant role.

The possibility of seeing and evaluating oneself the results of one's own labor on operating equipment is of great moral value, especially for young engineers and scientists. This accelerates significantly their occupational growth and makes it possible in practice to sense the vitality of the ties of science and production.

And still we have to do much more for the increase of the technical level of the equipment being developed. For the present too little attention is being devoted to the mechanization of auxiliary operations, to diagnostics and to the supply of the industrial equipment produced here with service tools, accessories, replacement and spare parts.

Here it should be emphasized again that the efficiency of scientific labor to a very significant degree is determined by how the institute party organization and its local units work. The organization and checking of execution hold an important place in the activity of the party buro. There is no need to explain that the more purposefully the decisions of party meetings and meetings of the party buro are implemented, the greater the authority of the party organization is and the more successful all the activity of the collective is. A special log, in which all the decisions of the party meetings and the party buro are recorded, has been introduced for the simplification and clearness of monitoring. The checking of the fulfillment of the decisions and recommendations of the party buro is usually assigned to the communists, who prepared the corresponding question for consideration.

However, at times even in case of the repeated discussion of an issue it is not possible to find the correct decision. Not all decisions are fulfilled on time. This, of course, does not do us credit. We should note self-critically that the party buro does not treat demandingly enough such cases of the lack of discipline.

The party buro periodically reports back at the party meetings on the progress of the fulfillment of decisions. A lively and principled exchange of

opinions, which takes place in an atmosphere of criticism and self-criticism, usually develops after the report.

A serious problem arose when discussing the work of the scientific departments. Usually the party buro plans during the year the detailed examination of the work of two or three scientific departments. But it was necessary to specify precisely what to analyze and how thoroughly. Party buro member V. Grigorenko was commissioned to develop a special method, which was also done. In conformity with it the basic activity of the scientific department, the questions of the introduction of developments and the realization of the economic impact, the work with personnel and the public political and creative activity of the staff members are analyzed. The opportunity appeared to compare the work of departments and to look more deeply into the essence of questions.

The People's Control group under the supervision of communist U. Verga is also contributing to the improvement of the work of the institute. This especially concerns the tightening up of discipline. With allowance made for the demands of the latest CPSU Central Committee plenums the party organization and the administration have elaborated a set of measures on the strengthening of organization and order, the fulfillment of which the People's Control group is checking. The results of the checks are quite perceptible.

Of course, the activity of the people's scouts is not limited to the checking of labor and production discipline. Now, for example, they have concentrated attention on the saving of material resources and are keeping track of the fulfillment of the requirement on stricter norm setting and of the preservation of physical assets.

The activity of the entire collective of our institute and of its party and other public organizations is aimed at the constant improvement of the style and the increase of the efficiency of work and the establishment of even closer and stronger ties with production, as the decisions of the 26th CPSU Congress and the subsequent party Central Committee plenums require. At present about 40 percent of the amount of scientific work is connected with the Tallinskiy elektrotekhnicheskiy zavod imeni M. I. Kalinina Production Association, the remainder is being performed for other enterprises, including the Vol'ta, Estoplast, Eesti Kaabel' and other plants. The role of the institute in the development of new tool engineering at many enterprises of the republic is well known. The institute can and should make a more significant contribution to the technical progress of the national economy. The tasks posed by the party bind its collective to this.

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## DEVELOPMENT OF SCIENCE, INFRASTRUCTURE

Vilnius KOMMUNIST in Russian No 4, Apr 84 pp 41-49

[Article by Doctor of Economic Sciences I. Manyushis: "Some Problems of the Development of Science and the Infrastructure"]

[Text] "In science there is no high road, and only whoever without fearing fatigue clammers up over its rocky paths can reach its gleaming heights."

(K. Marx, "Kapital" [Capital], Vol 1, Moscow, 1963 p 25.)

### Science as the Basis of Socioeconomic Development

The intensification of the development of the socialist economy requires the increase of attention to the group of sectors which serve the entire process of social production, that is, the sectors which have received the name of the infrastructure. Vast assets are being allocated for the development of the infrastructure. The task of production and science is to use them most efficiently.

Science is of great importance in the development and improvement of the production and social infrastructure. Here whereas transportation, communications, material and technical supply and other elements of the infrastructure create the necessary conditions for the functioning of modern production, science ensures the progress of this production (including the infrastructure).

### The Integration of Science and Production

The ways and means of combining the scientific product with production practice are diverse. Contractual relations, when scientific institutions perform work in accordance with the orders of production enterprises, associations and other organizations and assist the implementation of the results of their research, at present are the most widespread. A new promising form of the integration of science with production--scientific production and production scientific enterprises and associations--has appeared.

The development of science should lead the needs of practice. Therefore the accomplishment of the tasks of building communism presumes the availability of a scientific and technical reserve, which is a prerequisite of the extensive use of the achievements of the scientific and technical revolution.

The USSR State Committee for Science and Technology, the union State Planning Committee and the USSR Academy of Sciences have elaborated and approved 170 comprehensive programs, including 41 goal programs. The implementation of these programs already during the 11th Five-Year Plan should conditionally free more than 3 million workers and replace manual labor with machines for 500,000, save more than 4 million tons of ferrous and nonferrous metals and 50 million tons of fuel in conventional terms and save approximately 14 billion kWh of electric power.

In conformity with the approved programs much work has already been performed in the area of the fuel and energy complex. The structure of energy capacities has been improved by the commitment of atomic energy to the overall balance. In 1981 alone the capacities and the generation of electric power of nuclear electric power stations increased by 17.5 percent. Work is being carried out successfully at the construction site of the Ignalinskaya AES, where powerful 1.5 million kW nuclear reactors are being installed; the first power block was put into operation in late 1983. In the country in 1982 780,000 measures on new equipment with an annual economic impact of 4.8 billion rubles were introduced in production, 3,451 models of new types of machines, equipment, apparatus and instruments were developed. The implementation of measures on the scientific organization of labor in 1982 provided a saving of the labor of more than 300,000 people (these and the other data are taken from the collection of the USSR Central Statistical Administration "Narodnoye khozyaystvo SSSR. 1982" [The USSR National Economy. 1982], Moscow, 1983, p 92).

The economic impact from the use of inventions and efficiency proposals in 1982 came to 7.0 billion rubles.

Frequently the introduction of the results of science lags behind the needs of practice. Due to the long periods of the introduction of the results of scientific developments in production advanced scientific ideas are frequently assimilated slowly, a gap in the technical level of individual sectors of the national economy is allowed, the effectiveness of the expenditures on the development of science and technology decreases and as a result the rate of scientific and technical progress in some directions or others is insufficiently great.

Among the factors, which hinder the rapid use of the achievements of the scientific and technical revolution, one should note the shortcomings of planning and material and technical supply, the inadequate interests of the workers of scientific institutions and the production sphere in the quickest possible introduction of innovations and the incompleteness of many scientific developments which complicate their implementation. The decree of the CPSU Central Committee and the USSR Council of Ministers "On Measures on the Acceleration of Scientific and Technical Progress in the National Economy," which was adopted in August 1983, is aimed at the elimination of these and

other shortcomings. It is noted in it that ministries, departments, the USSR Academy of Sciences and the State Committee for Science and Technology are not displaying the proper persistence in the pursuit of a uniform scientific and technical policy.

The CPSU Central Committee and the USSR Council of Ministers have charged the State Committee for Science and Technology, the USSR State Planning Committee, the USSR State Committee for Construction Affairs, the USSR Academy of Sciences, USSR ministries and departments and the councils of ministers of the union republics to implement measures on the development of the network of large associations and enterprises and the further concentration of the potential of scientific research, design and technological organizations on the accomplishment of the tasks which ensure the meeting of both the current and long-range needs of the national economy. It is deemed expedient to expand the practice of the organization at associations and enterprises of temporary scientific production subdivisions for the most important national economic problems.

Certain difficulties arise in case of the quantitative expression of the use value of acquired scientific knowledge. To a great extent this is due to the diversity of the manifestation of the effective impact subject to the conditions and the place of the use of the knowledge, the time factor and other factors. Here the same scientific developments can be used inadequately, in a different combination with other knowledge, while the impact may appear in the distant future, after the emergence of the conditions for the implementation of the results of science. Naturally, this complicates the planning of scientific activity and, in particular, its efficiency.

#### The Implementation of the Achievements of Science and Technology

The 24th CPSU Congress posed a task of exceptional importance--"to combine fundamentally the achievements of the scientific and technical revolution with the advantages of the socialist economic system, to develop its own forms, which are characteristic of socialism, of the combination of science with production" ("Materialy XXIV s"yezda KPSS" [Materials of the 26th CPSU Congress], p 57). On the basis of the systematic development of scientific research and the practical use of its results it is necessary to ensure rapid progress in all spheres, first of all in the increase of the efficiency of social production and work quality in all the units of the national economy.

Our country has a considerable scientific potential, which is making it possible to accomplish successfully the tasks posed by the party and government. In the USSR there are several thousand scientific institutions, while the number of scientists comes to more than 1.4 million. In 1917-1982 the higher and secondary specialized educational institutions of the country trained 47.1 million specialists, of them 18.3 million with a higher education and 29.0 million with a secondary specialized education. During the years of the 10th Five-Year Plan alone higher and secondary specialized educational institutions trained 10 million specialists. This is promoting the effective introduction of the achievements of science and technology in production practice. A mighty scientific potential has been developed during the postwar period.

Table 1

Increase of the Number of Scientists in the USSR  
1950-1981

(at the end of the year, thousands)

	1950	1965	1970	1980	1982
Scientists (including scientific teaching personnel)--total.....	162.5	664.4	927.7	1373.3	1431.7
Of them with an academic degree:					
doctors of sciences.....	8.3	14.8	23.6	37.3	39.7
candidates of scientists.....	45.5	134.4	224.5	396.2	423.0
Of the total number of scientists those having an academic title:					
academician, corresponding member, professor.....	8.9	12.5	18.1	27.4	28.7
docent.....	21.0	48.6	68.7	110.7	121.3
senior scientific associate.....	11.4	28.7	39.0	66.0	70.9
junior scientific associate and assistant.....	19.6	48.9	48.8	41.1	40.6

In many most important directions Soviet scientists hold leading positions in world science. Outstanding gains have been achieved in space research, applied mathematics, physics, chemistry, biology and the elaboration of many social and economic problems. Important work has been performed by our scientists on the accomplishment of fundamental tasks of the development of the national economy. The cooperation of scientific forces with the socialist countries along the line of CEMA is of great importance for the maintenance of leading positions in the main directions of scientific research.

The socialist economic system creates the conditions for the rapid implementation of the results of science. The outstanding achievements of our country in the leading fields of technology and production attest to this. The Soviet Union was the first to place nuclear energy at the service of peaceful purposes, the first to go into space and the first to build the "Lenin" nuclear-powered icebreaker. The building in space of manned complexes with the Salyut-6 orbital station and the accomplishment of the conveyance to this station of crews of other spacecraft, as well as various cargo by means of transport spacecraft are a most important scientific and technical achievement.

The needs of society in the area of economic and social development are posing newer and newer important tasks for Soviet scientists.

One of the most important areas of the application of scientific knowledge is power engineering. This sector in our country is being developed rapidly and is at the front line of technical progress with respect to many most important indicators (the unit power of generating units, voltage, the distance of electric power transmission and others). The rapid increase of the need for energy resources is posing difficult problems for science and practice.

In the area of the improvement of the objects of labor the successes of the scientific and technical revolution presume the further significant increase of the production of various synthetic materials, both organic and inorganic, the improvement of their qualitative characteristics and the broadening of the sphere of application. A most important task in this area--the development of materials with preset useful properties, that is, in accordance with the orders of consumers--has to be accomplished. The extensive use of synthetic materials in the national economy and daily life promises enormous economic advantages.

The successes of science in the area of solid-state physics are making practicable the radical improvement of the qualitative characteristics of traditional materials--metal, wood, stone and others. This problem is exceptionally urgent.

Fundamental changes are anticipated in the matter of the improvement of the tools of labor. The use of metalworking and other machines, which operate on the basis of new physical principles, is promising. Such machines in principle have already been developed, but their introduction in production requires additional scientific research and practical work. The use in power engineering, machine building and other sectors of superconducting materials promises an enormous impact.

In the improvement of production technology scientific and technical progress presumes the introduction of new flow charts which are based on the use of radiant, chemical, electrochemical and other types of energy.

Scientific and technical progress is having a substantial influence on the organization and management of production. Mathematical modeling and linear programming, modern optimization methods, office equipment, automated control systems of technological processes and enterprises--all these means are called upon to raise the level of the organization and management of production to a new stage.

The scientific and technical revolution will change the content of labor and the role of man himself in production. Complete mechanization and automation will free him from direct involvement in the production process, while reserving for him primarily control functions and work on designing, the care of equipment and the elaboration of programs of the organization and management of production.

An exceptionally important problem of the present, which requires the unremitting attention and joint efforts of science and practice, is environmental protection.

The role of science in the solution of the problems of the development of the infrastructure consists first of all in the substantiation of the role and place of the infrastructure in the national economic complex and the determination of the most efficient means of the development of its basic elements and their optimum combination. These questions should be settled both with respect to the national economy as a whole and as applied to individual sectors, as well as regions with allowance made for their features.

## Science and the Accomplishment of Regional Tasks

During the years of Soviet power science has undergone extensive development in all the union republics. Republic academies of sciences, the Siberian Department of the USSR Academy of Sciences and a number of outlying centers and affiliates of the USSR Academy of Sciences have been set up. All this made it possible to bring science closer to the immediate needs of production and to solve more rapidly and specifically the tasks which arise locally during the drafting and implementation of current and long-range national economic plans. It is possible to judge the great effectiveness of regional science on the basis of the activity of the scientific and scientific research institutions of the Soviet Baltic republics.

Table 2

### Number of Scientists in the Soviet Baltic Republics in 1982 (at the end of the year)

	Lithuanian SSR	Latvian SSR	Estonian SSR
Scientists (including scientific teaching personnel)--total, thousands.....	14.6	13.3	6.7
including with an academic degree:			
doctor of sciences.....	400	300	300
candidate of sciences.....	5600	4400	2800
Of the total number of scientists those who have an academic title:			
academician, corresponding member,			
professor.....	373	373*	221*
docent.....	2021	1197*	703
senior scientific associate.....	931	628*	523

\* The data are for 1981.

Academic work in the Baltic republics is oriented toward a wide range of problems of both a basic and applied nature, which are connected with the accomplishment of important scientific and technical tasks of regional and statewide importance.

During the 11th Five-Year Plan scientists of the Lithuanian SSR are elaborating 46 problems, which encompass 661 themes, 20 problems are of all-union importance, 17 are of republic importance and 7 are of interdepartmental importance, 12 scientific research institutes of the Lithuanian SSR Academy of Sciences in 1984 are elaborating 33 comprehensive programs, of them more than half are on the basic sciences, the remainder are of a scientific, technical and applied purpose. Republic higher educational institutions and other scientific institutions will fulfill 374 themes on 41 problems. The republic Academy of Sciences and higher educational institutions are constantly cooperating with the most important scientific centers of the Soviet Union and many scientific institutions of foreign countries, especially with the

socialist countries along the line of CEMA. The Academy of Sciences is coordinating and conducting jointly with other scientific institutions of the republic research in 18 scientific directions (the natural, social, physical mathematical and technical sciences). During the years of the 10th Five-Year Plan the economic impact from the introduction in production of scientific research and development came to about 220 million rubles. The Institute of Semiconductor Physics of the Lithuanian SSR Academy of Sciences has made a significant contribution to the knowledge of the properties of semiconductor materials and their practical use.

In the themes of academic institutes the proportion of applied operations, which are being carried out, as a rule, on the basis of theoretical research, which ensures the novelty and promise of the results, is increasing. The Institute of Physical Technical Problems of Power Engineering of the Lithuanian SSR Academy of Sciences with the participation of other organizations and institutions has prepared a fuel and energy balance of the republic for the period to 1990 and a balance of water resources to 2000. When performing the latter job the state of water resources in 25 cities was examined comprehensively.

The Institute of Chemistry and Chemical Technology of the Lithuanian SSR Academy of Sciences is making a large contribution to the technical progress of production. The institute has developed more than 80 technological processes with respect to electroplatings. They have all been introduced in production at more than 800 enterprises of the Soviet Union and the CEMA countries (in machine building, the automotive industry, instrument making, the electronics and radio engineering industry). In 1978 an experimental base, at which new compositions and processes of the formation of electroplatings are tested, was set up at the institute. This makes it possible to shorten to one-third to one-half the cycle of the transfer of research to production. The economic impact from the introduction of the scientific research comes to millions of rubles a year.

The Institute of Economics of the Lithuanian SSR Academy of Sciences is participating in the elaboration of 14 comprehensive programs. Of them the institute is the parent organization for four programs. The long-term comprehensive plans and forecasts of the development and distribution of productive forces in the Lithuanian SSR to 1980 were formulated here. They were examined and approved by the Central Committee of the Communist Party of Lithuania and the Lithuanian SSR Council of Ministers in 1964. The carrying out of construction according to approved plans made it possible to distribute efficiently the development of productive forces on the territory of the republic. The construction of industrial enterprises in major industrial cities (Vilnius, Kaunas, Klaypeda and others) decreased significantly. Six new regions of industrial construction, which have the necessary manpower and water resources, were formed on the basis of several rayon centers. New industrial centers--Alitus, Kapsukas, Mazheykyay, Utena, Nauyeyi Akmyane and Ionava--appeared on the map of Lithuania. Scientists of the institute have prepared a method of regional intersectorial balances of the production and distribution of products and are developing multisector models of the forecasting of reproduction. The elaboration (jointly with other scientific organizations of the republic) of a comprehensive long-range program of

scientific and technical progress for 1986-2005 (by 5-year periods) was the most important task of the Institute of Economics of the Lithuanian SSR Academy of Sciences during 1981-1983. In May 1983 the Republic Comprehensive Program was examined and approved by the Central Committee of the Communist Party of Lithuania and the Republic Council of Ministers. It was also approved by the USSR Academy of Sciences. Now the Institute of Economics has begun the elaboration of a comprehensive program of scientific and technical progress to 2010.

The instrument making industry has been developed in the Lithuanian SSR. In instrument making practical steps have been taken toward the extensive use of microprocessor equipment. Microprocessor equipment affords opportunities for the transition from the automation of individual sections and operations to the automation of technological complexes and entire enterprises.

An important role in the acceleration of technical progress in the Baltic republics belongs to the sectorial and departmental scientific research institutes and laboratories, which are occupied mainly with the problems of the improvement and the increase of the efficiency of industrial and agricultural production. A number of scientific institutions are working in the area of capital construction. In the republic there are also affiliates of many union sectorial scientific research institutions, which are working on specific questions of the development and improvement of production and other important problems. The work of all these institutions, as a rule, is of an applied nature.

More than 15 years have passed since the setting up of the first scientific production associations. Their activity has shown great efficiency in the development and introduction of new equipment and advanced technology and in the efficient settlement of infrastructural questions. Thus, the assimilation in the national economy of the new materials and technological processes, which were developed by the Plastmassy Scientific Production Association in 1982, is making it possible to free in the chemical industry 1,300 workers and to save annually in the consuming sectors more than 130 million kWh of electric power and about 150,000 tons of nonferrous metals. Here the economic impact comes to more than 365 million rubles a year. The Elektronika Scientific Production Association is working fruitfully. The collective of its parent enterprise in close cooperation with the Institute of Semiconductor Physics of the Lithuanian SSR Academy of Sciences and other institutes of the Lithuanian SSR Academy of Sciences is successfully solving complicated scientific and technical problems. The recently formed Vibrotekhnika Scientific Production Association, as well as the Litstankoproyekt Scientific Production Association for the Comprehensive Designing of Machine Tool Building Plants, which has a large planning and design subdivision for the development and introduction in production of new technological processes, are operating successfully. The machine tools, which were developed by Lithuanian machine builders, received a high rating at the international exhibitions in Poznan, Belgrad and London and at the Stanki-72 exhibition in Moscow. At the Leipzig trade fair (GDR) in 1976 gold medals were awarded to three machine tools of Lithuanian enterprises. The Sigma Production Association of the USSR Ministry of Instrument Making and Automation Equipment is the leading production association in the republic. Established in 1965, it has a

significant production, scientific and technical potential and planning and design bureaus, operates profitably and smoothly, systematically fulfills the plan assignments and has achieved good economic indicators. It is expedient to transform this association into a scientific production association for the production of small computers for statistical calculations.

The Neris Production Association is the parent enterprise for the production of units for grass and straw processing. This is the only enterprise of this type, which produces very necessary units for agriculture of the entire country. However, the expenditures on the transportation of raw materials, materials and finished products cost the state 6 million rubles a year. The Neris Scientific Production Association for Grass- and Straw-Processing Equipment with the fulfillment of the functions of the scientific production center of the country in this area and with the organization of new production capacities for the series production of sets of this equipment in other republics should be established.

For this the USSR State Planning Committee could prepare a document on the comprehensive planning of the activity of scientific production associations as an economically integrated unit, as well as draw up the corresponding procedural instructions on the formulation of their five-year plans. The lack of these documents does not make it possible to compile official statistical returns which characterize the activity of the scientific production associations as a whole. In the decisions of the November (1982) CPSU Central Committee Plenum it was indicated that the methods of planning and the system of material stimulation should contribute to the unification of science and production. At the plenum it was noted that it is necessary to support those who boldly agree to the introduction of new equipment. One must not allow them to find themselves in a disadvantageous position.

Scientists of the Baltic republics are devoting much attention to questions of environmental protection. The urgency of this task is governed by the considerable reclamation work, which has been performed in the republics, as well as by the problem of protecting the Baltic Sea from pollution. The USSR Government has adopted a decree, which specifies a set of measures on the protection of this water basin. Scientific institutions of the Baltic republics are participating in the research on the implementation of these measures.

In conformity with the decisions of the 26th party congress and the subsequent CPSU Central Committee Plenums on the improvement of the economic mechanism the CPSU Central Committee and the USSR Council of Ministers resolved to conduct in a number of ministries, including the Lithuanian SSR Ministry of Local Industry, an economic experiment on the broadening of the rights of production associations (enterprises) in planning and economic operations and on the increase of their responsibility for the results of the work. The task was posed to create on the basis of the improvement of planning work in associations (enterprises) such conditions which would stimulate high quality, highly productive labor, initiative and enterprise and would ensure the acceleration of scientific and technical progress and the intensification of production. The managers of associations (enterprises) have been granted the

right to increase the wage for workers by 16 to 24 percent and for engineering and technical personnel by up to 50 percent.

Only automatic telephone exchanges now operate in city and village telephone communications, while exchanges of the coordinate type operate in rural areas. The automation of long-distance telephone communications will be completed during the 11th Five-Year Plan. Work is being performed on the installation in Vilnius of a quasi-electronic telephone exchange of the Kvartz type, which will enable all the subscribers of urban and rural telephone exchanges of the republic to make automatic connections among themselves and with subscribers outside the republic. Such an exchange of domestic make, the operation of which is controlled by a computer, is being built for the first time in the country. Exchanges of the Altay type for telephone communications with moving objects have been installed in five large cities of the Lithuanian SSR--Vilnius, Kaunas, Klaypeda, Shyulyay and Panevezhis.

In conformity with the basic directions of economic and social development, which were approved by the 26th CPSU Congress, responsible tasks have been posed for the communications sector: to continue the formation of a unified automated communications network of the country on the basis of the latest data transmission systems, to develop color television and stereo radio broadcasting. Earth satellites will be used more extensively for the organization of multichannel television and radio broadcasting.

The workers of the Republic Television Center jointly with the State Scientific Research Institute of Radio are now preparing the work on the changeover to the automatic monitoring and control by means of computer of the operation of all the television transmitters of the republic.

However, substantial shortcomings are occurring in the scientific solution of infrastructural problems, and the main one of them consists in the lack of a uniform approach to the settlement of questions of the production and social infrastructure. Not the entire set of infrastructural elements, but individual components of it are covered by scientific research and practical implementation. As a result some areas of the infrastructure are being developed at a leading pace, while others (urban municipal services, material and technical supply) are lagging. Apparently, the need has arisen for the establishment of specialized scientific research organizations, which would be charged to solve the entire set of problems, which is connected with the development and improvement of the infrastructure on both the all-union and regional scale.

In the decree of the CPSU Central Committee "On the Further Development and the Increase of the Efficiency of the Brigade Form of the Organization and Stimulation of Labor in Industry" it is noted that the brigade form of the organization and stimulation of labor is one of the directions of the increase of the efficiency of work and the extensive involvement of the working people in production management and education. The brigades constitute the basic production and social unit of labor collectives. New forms of socialist competition, which meet the present requirements, also arise at the same time as the origination of new brigades--multiple-skill brigades, multistage

brigades, brigades which work on a single order with the remuneration of labor for the end results.

Engineering and technical personnel are obliged to answer for the engineering support of the brigade form of the organization of labor and to give them practical support when organizing socialist competition among brigades for the end results of the work and the saving of material resources. Unfortunately, the new form of collective organization in combination with socialist competition is still not being fully utilized always and everywhere.

In a speech at the February (1984) CPSU Central Committee Plenum Comrade K. U. Chernenko noted that it is necessary "to display greater independence at all levels, to boldly make a search, to agree, if necessary, to a certain risk in the name of the increase of the efficiency of the economy, the increase of the well-being of the people--that is what we expect from our economic personnel." Therefore, the party requires that party organs would look more deeply into the activity of associations and enterprises on the introduction of the brigade form of the organization of labor and would increase the responsibility of economic managers, party and trade union workers for the development of the labor and social activity of the members of brigades in the fulfillment of the plan assignments and socialist obligations.

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INTENSIFIED RESEARCH, DEVELOPMENT IN AZERBAIJAN

Baku BAKINSKIY RABOCHIY in Russian 24 May 84 p 1

[Unsigned article:"At the Azerbaijan Communist Party Central Committee"]

[Text] The Azerbaijan Communist Party Central Committee discussed the initiative by scientists and specialists at scientific institutions and industrial enterprises in the republic to further deepen the integration of science and production and to accelerate the economic introduction of contemporary scientific and technical achievements.

The decree approved noted that labor collectives at a number of enterprises, scientific research, planning design and technological institutes in Baku and Sumgait, inspired by the decisions of the February and April (1984) CPSU Central Committee Plena and the principles cited by K. U. Chernenko, General Secretary of the CPSU Central Committee and USSR Supreme Soviet Presidium Chairman, have begun a patriotic initiative based on thorough cooperation between science and production to improve technical standards and product quality, accelerate the introduction of resource and energy saving technology, mechanized and automated production processes and to reduce the share of heavy manual operations.

In close creative cooperation with the Baku division of the All Union Scientific Research and Planning Design Institute for Electrical Machinery Building Technology, the collective at the Azerelektromash Production Association has concentrated efforts on a complex of work to reconstruct, mechanize and automate production operations, improve manufacturing processes and use new, less material intensive electric motors with the most up to date technoeconomic parameters. Low waste technology, automatic lines for cutting out patterns from steel coils and automated quality control using microprocessors are being actively introduced at the association's main plant. The introduction of these and other technical innovations will permit the collective to, by the five-year plan's end, save more than 3 million rubles, 1,400 tons of rolled ferrous metals, including 1,200 tons of expensive electrical engineering steel, improve labor productivity and conditionally release 400 workers.

Scientists and specialists at the Azerbaijan Institute for Petroleum Machine Building are working in close creative cooperation with the collective of the Kishlinskiy Machine Building Plant on development and production of a new,

highly mechanized lift unit for repairing oil and gas wells, a comprehensively equipped system for mechanizing round trip operations at wells which will increase labor productivity during well repairs by 30 percent, completely eliminate heavy manual labor and improve production standards.

The collectives of the All Union Scientific Research and Design Institute for the Transportation Preparation and Processing of Natural Gas and the Azerbaijan Gas Processing Plant of the VPO [All Union Production Association] Kaspmorneftegaz-prom [Caspian Sea Oil and Gas Field] are working on the introduction of a highly effective scheme for the modernization of existing operations. This will make it possible to be one year ahead of schedule in mastering production capacity at natural gasoline extracting installations and, by the five-year plan's end increase labor productivity by 10 percent and obtain an additional 7 million rubles worth of gas fuel and hydrocarbon feedstocks for the chemical industry.

The Novo Baku Petroleum Refinery imeni Vladimir Il'ich and the AzSSR Academy of Sciences' Institute of Petrochemical Processes imeni Yu. G. Mamedaliyev have assumed obligations to increase the depth of gasoline extraction by 2 percent through the introduction of progressive technology for catalytic cracking, considerably improve quality, reduce production costs by 800,000 rubles and sharply reduce catalyst use.

By the end of the five-year plan, the concentration of scientific and engineering efforts at the Khimprom Association and the AzSSR Academy of Sciences' Institute for Chloroorganic Synthesis on the maximum use of chemical production wastes will make it possible to produce 2 million rubles worth of above plan output, obtain an additional 300,000 rubles of profits and sharply reduce watershed pollution by harmful industrial wastes.

Recognizing that the integration of science and production and the close union of creative thought and labor are a major reserve for intensifying the republic's economy and improving the efficiency of public production, the Azerbaijan Communist Party Central Committee approved the patriotic initiative by scientists and specialists at scientific research and planning design institutes in Baku and Sumgait, by the collectives of the Azerelektromash and Khimprom Production Associations, the Kishlinskiy Machine Building Plant, the Azerbaijan Gas Preparation Plant and the Novo Baku Petroleum Refinery imeni Vladimir Il'ich to further deepen and expand the ties between science and production, reduce the time for the economic introduction of progressive technology and scientific achievements and upon this basis improve the efficiency and intensify public production.

It is suggested that party obkoms, gorkoms and raykoms, the ASPS [Azerbaijan Trade Union Council], the Azerbaijan Komsomol Central Committee, ministries and departments and primary party organizations widely support the initiative of these enterprises and scientific institutions which have expanded activities to improve the use of feedstocks and material resources, enhance output quality and technoeconomic indicators, mechanize and automate production and accelerate the growth of labor productivity.

Guided by the decisions of the CPSU Central Committee February and April (1984) Plena and the instructions of comrade K. U. Chernenko, the labor and political activities of workers are to be developed. Collectives are directed towards accelerating scientific and technical progress in all sectors of the economy, universally improving labor productivity and fulfilling 1984 plans and socialist obligations and the five-year plan in general with lower production outlays and costs.

The republic Academy of Sciences, Minvuz [Ministry of Higher Education], sector scientific research, technological and planning-design organizations, higher educational institutions, ministries, departments and enterprises should constantly deepen and expand economic and contractual ties between science and production. They should improve the efficiency of scientific research and design work, its quality and economic efficiency and accelerate the development and production introduction of new, highly productive resource saving technology and progressive low waste and waste free processes.

Republic Gosplan, ministries and departments are obligated to intensify the impact of planning on solutions to key national economic and social problems: the development and introduction of energy and resource saving technology and processes, the modernization and technical reequipment of production operations and the acceleration of labor productivity growth rates. Starting from the necessity of further intensifying the integration of science and production and the widespread practical introduction of science, technology and practical experience, they should expand the use of targeted scientific and technical programs during the 12th Five-Year Plan.

The editorial boards of republic newspapers and Gosteleradio [State Committee for Television and Radio Broadcasting] are entrusted with convincingly and thoroughly revealing the experiences of progressive enterprises which have accelerated scientific and technical progress and achieved high production efficiency through strengthening their ties with scientific research institutions. Special attention is to be given to fulfillment of state plans for the introduction of new technology and targeted scientific and technical programs. Shortcomings and oversights in this work are to be more sharply criticized.

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## RESPONSIBILITIES OF MACHINE BUILDERS OUTLINED AT SEMINAR

Kiev PRAVDA UKRAINY in Russian 8 Jun 84 p 3

[Article: "The Higher Duty of Machine Builders"]

[Text] The republic seminar of secretaries of the party organizations of machine building enterprises, institutes and design bureaus took place 5 and 6 June in Dnepropetrovsk. The seminar participants discussed ways to strengthen organizational and political work to increase production efficiency and to accelerate scientific and technical progress in the light of the demands of the 26th CPSU Congress, subsequent CPSU Central Committee plenums and the instructions of Comrade K. U. Chernenko, general secretary of the CPSU Central Committee and chairman of the USSR Supreme Soviet Presidium.

Ya. P. Potrebnyak, candidate for Politburo membership and secretary of the Ukrainian Communist Party [CPUk] Central Committee, delivered a report at the seminar. He noted that the workers of the republic, as of the entire country, are working diligently to implement the plans of the 11th Five-Year Plan and are consistently performing tasks to lead the economy to the intensive path of development and to accelerate scientific and technical progress. Machine building, a key industry sector, is playing a decisive role in the technical re-equipment of all sectors of the national economy. It is developing at a very rapid rate in the republic. Since the beginning of the five-year plan, production volume increased by 13.1 percent and labor productivity rose by 11.5 percent, exceeding the annual plans. During the first 3 years of the five-year plan, more than 1,280 experimental models of new technology were created, about 1,400 new types of output were assimilated for the first time, and production of almost 1,000 obsolete designs, machines and instruments was discontinued. For the first 3 years of the five-year plan, the economic impact of the introduction of scientific and technical measures amounted to R1.066 billion.

At the same time, it was pointed out in the report that individual production and scientific collectives are still not working effectively and output is poor. The party organizations of the associations, enterprises, institutes and design bureaus must mobilize the efforts of scientists, specialists and all workers to meet fully the growing demands of the national economy for modern technology, especially in energy, iron and steel, transport, and the agroindustrial complex. The accelerated creation of this technology and the immediate introduction into production and expansion of the volume of output

must constantly be the center of attention of party organizations. They are obligated to fight resolutely and without compromise against manifestations of stagnation and conservatism. The most important task is to increase the technical level of the machinery and instruments produced. The duty of machine builders is to expand the production of modern everyday technology and consumer goods.

The seminar devoted considerable attention to the tasks associated with intensifying production in machine building itself. The principal way of doing this is to accelerate automation based upon advanced industrial processes and flexible reorganized complexes and to introduce robotics. In this connection, mention was made of the significance of the assimilation at the enterprises of Dnepropetrovsk Oblast of an overall system of quality control of production and effective use of resources, especially the experience of combine builders in the certification and rationalization of jobs. The importance of the all-round development of brigade forms of labor organization was pointed out.

V. G. Boyko, first secretary of the party obkom, informed the seminar participants of the experience of the work of party organizations of Dnepropetrovsk Oblast to develop the creative activity of labor collectives directed toward intensification and an increase in production efficiency. The speech of A. A. Pusanov, deputy head of the machine building section of the CPSU Central Committee, was dedicated to the basic tasks of accelerating scientific and technical progress in machine building and to improving the work under the conditions of the economic experiment. A. D. Pelykh, deputy head of the section for organizational-party work of the CPUk Central Committee, dwelled on several questions involving the further organizational-political strengthening of primary party organizations and an increase in their aggressiveness. N. A. Litvin, deputy head of the section for propaganda and agitation of the CPUk, discussed several questions concerning ideological and mass-political work under current conditions. The speech of I. K. Pokhodin, vice president of the Ukrainian SSR Academy of Sciences, dealt with the contribution of the academic institutes in accelerating scientific and technical progress and with ways to strengthen the creative cooperation of scientists and producers.

Questions of increasing production efficiency and strengthening the organizational and political work of party organizations were discussed at section meetings, which took place at enterprises, scientific-research institutions and urban educational institutions.

Participating in the seminar work were V. M. Gayevoy, head of the section for machine building of the CPUk Central Committee, the heads of the branch sections of the party obkoms, and the managers of several republic departments and organizations.

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CSO: 1814/183

## CONFERENCE ANALYZES HUMAN FACTORS ENGINEERING

Yerevan KOMMUNIST in Russian 30 Apr 84 p 4

[Interview with Professor Yu. M. Zabrodin, doctor of psychological science, deputy director of the Institute of Psychology, by Yu. Kankanyan; 20 April 1984, Tsakhkadzor, ArSSR ]

[Text] Some call the 20th Century the epoch of cosmonautics, others, the era of nuclear energy, a third group considers it the world of radio electronics and automation, while many can prove that this is the age of chemistry.

Probably, every point of view is true in its own way.

Thanks to intensive mechanization and automation, today the majority of manufacturing and other production processes in industry, agriculture, construction and transportation machines have taken the main load of work on their own "shoulders", freeing people from heavy physical labor. Work is, to some extent, becoming intellectual. The energy and power ties linking people's activities are being replaced by information ties.

An ever greater part of the load in the labor process is being shifted to the human psyche, expending its powers on the reception and processing of information and decision making. The characteristics of labor are increasing the human factor role in modern production. By this term is understood the wide circle of psychological features people possess which are manifested in work and which influence its quality and efficiency.

If one translates the term "human factor" into the language of objective statistics some very impressive figures are obtained. According to UN data, only about 8 - 10 percent of those working in industry have psychophysiological qualities corresponding to their jobs' demands. The human factor is responsible for 40 percent of auto accidents, 65 percent of industrial and mine accidents and 80 - 90 percent of disturbances in thermal electric power plant operating conditions. This list could be continued, but it is sufficient to show that a full and thorough inclusion of the human factor could help in preventing huge losses.

The problem of matching people's psychological potentials and technology, which has become distinctly visible in recent years, was the subject of the Second All Union Conference "The Psychological Aspects of Trainer Construction", which took

place in Tsakhadzor from the 17th to the 20th of April. At the concluding "Round Table" of the conference, Armenpress correspondent Yu. Kankanyan asked Professor YU. M. Zabrodin, doctor of psychological science and deputy director of the USSR Academy of Sciences' Institute of Psychology to answer a number of questions:

[Question] Yuriy Mikhaylovich, how would you explain this insistent penetration of psychology into all spheres of our lives?

[Answer] It would be no exaggeration to state that people today are incapable of solving any large problem without the help of psychologists. There is nothing surprising in this. After all, psychology studies people's psychic make up, and since this is the brain's reflection of reality, it turns out that psychology touches upon every aspect of our lives. Take for example, a person's activities in a complicated modern production operation. This is now studied by several psychological disciplines: labor psychology, management psychology, social psychology, recently economic psychology and finally engineering psychology. These disciplines have the common task of making each individual's labor highly productive and satisfactory. All directions of the science can help solve the most diverse problems: from the formation of labor habits to the formation of professionally valuable qualities and skills; from a rationally arranged working day to problems of a healthy psychological climate at enterprises and collectives; from the organization of the work site to the creation of a new type of economic thinking.

However, it is true that engineering psychology is the most involved in studying the human factor in technology. Its subject is human activity in relation to machine operation, that is, the so-called man-machine system, consisting of an operator and a machine with which the labor is performed.

[Question] You mentioned the profession of operator, which is called the profession of the epoch. Just what demands does scientific and technical progress make upon it?

[Answer] I think I agree with this evaluation. The operator at the control panel; this picture has become a unique symbol of contemporary production. Take, for example, the control room of a modern energy block at a thermal or nuclear power plant. Here, just like in a brain, signals flow in from hundreds of sensors, measuring temperature, pressure, fuel and water consumption and various electrical parameters characterizing the generation process and equipment condition. All the information is shown by a multitude of instruments which the operator must follow, not permitting any of them to deviate. How promptly operators perceive the information and how correctly they process it affects not only the productivity and operational safety of equipment in the power plant itself, but also the normal activities of electrical energy consumers. Obviously, this problem is not restricted to power engineering. There are similar situations in metallurgy, chemistry and other sectors.

As the price of mistakes is growing significantly, the huge moral and economic responsibility of operators began to have a perceptible influence on specialists' activities. Often faulty work or errors at a single work place can have catastrophic consequences.

Today an operator must develop the capability of being able to rapidly become oriented towards diverse phenomena, new technology and processes. This adjustment cannot be slow and gradual as before. As Academician V. K. Ambartsumyan notes, a far more flexible and dynamic psyche is required.

Any training process must, above all, be viewed as a psychological process. This makes the set of problems covered by this conference clear and urgent. It examined the psychological aspects of training operators to use equipment. Perhaps the most important achievement discussed at Tsakhkadzor is the understanding of the training process as a control system: operator -- equipment -- instructor.

[Question] In view of the problem's newness, are ideas about training aids in this chain being reexamined?

[Answer] In order to carry out this process and train future operators in the necessary habits and skills, it is essential to have equipment simulating the operations of various mechanisms or systems. Foreign and domestic experience shows that trainers play an important role in preparing key personnel for a number of specialities. There are a number of trainer devices: for short term memory and reaction, psychological reactions, adaptation and aviation simulators. However, the word "trainer" ["trenazher"] designating a copy of an airplane sitting on the ground, does not completely reflect its true function. Trainers are increasingly being used as instructional devices. Therefore, the scientific, technical and methodological task is to expand trainer functions and give them educational uses.

The creation and use of so-called psychological trainers is a new and very important direction in operator training. This process begins by giving operators flexible and nonspecific habits and skills. Their later transfer to any specific type of activity is quicker and more effective. The Engineering Psychology Laboratory at Yerevan University is successfully working on such trainers to be introduced in the chemical industry.

[Question] Finally, why were both conferences held in Yerevan?

[Answer] I would also include the All Union Seminar in 1979, which brought leading specialists in engineering psychology to the republic. Undoubtedly, this is a measure of respect for Armenian scientists working on the psychological aspects of trainer construction. Above all I have in mind the collective at the Yerevan State University Engineering Laboratory led by Docent R. Aguzumtsyan, candidate of psychological science. They are conducting research on one of the fundamental problems of contemporary engineering psychology -- the reliability and efficiency of "human - technology" systems. Research results have been successfully applied in the development of training systems for operators at chemical plants and nuclear power plants and for telegraph operators.

It would be advisable to consider setting up a scientific research center for applied psychology in the republic.

## EXPERTS DISCUSS ROLE OF SCIENTISTS IN ECONOMY OF SVERDLOVSK OBLAST

Moscow SOVETSKAYA ROSSIYA in Russian 4 Jul 84 p 3

[Roundtable discussion written up by SOVETSKAYA ROSSIYA special correspondents V. Denisov and V. Lysenko: "Allied with Practice"]

[Text] The scientists have developed a new machine, apparatus, technology... It has been shown that it is possible to introduce them, the economic effect has been calculated. But are the producers in agreement with the new idea? And if they are, are they about to introduce it? And if they start to introduce it how quickly will it be done? Practice shows that far from every innovation, even the most promising ones, finds its place at the enterprise.

It turns out that the reserve from what is unutilized is still very great, as discussed at the CPSU Central Committee December (1983) and February and April (1984) plenums and in the CPSU Central Committee and USSR Council of Ministers decree on measures to further accelerate scientific and technical progress in the national economy.

Why is the fate of the innovation sometimes so sad? What must be undertaken in order to change the situation? This was the subject of an interesting roundtable discussion by SOVETSKAYA ROSSIYA in Sverdlovsk. Both scientists and the managers of industrial enterprises took part in it: Hero of Socialist Labor, State Prize laureate, corresponding member of the USSR Academy of Sciences Georgiy Lukich Khimich, chief of the Department for Comprehensive Problems of Machine Building in the USSR Academy of Sciences Ural Scientific Center; doctor of physico-mathematical sciences, professor Vladimir Pavlovich Skripov, chief of the Department for Physico-Technical Problems in Power Engineering at the USSR Academy of Sciences Ural Scientific Center; candidate of technical sciences Yevgeniy Vasil'yevich Volkov, laboratory chief in the same department; State Prize laureate Gennadiy Nikolayevich Bashilov, director of the Uralmash Production Association Scientific Research, Design and Technological

Institute of Heavy Machinery Manufacture; candidate of technical sciences and State Prize laureate Yuriy Petrovich Glazkov, general director of the Uralelektrotyazhmarsh Production Association; and State Prize laureate Nikolay Kirillovich Globin, chief engineer at the Uralkhimmash Production Association.

A "Strange" Sector.

Khimich: Let me start with an example. Remembering me from way back, not only as a scientist but also as a former chief designer at Uralmash, the chief engineer of the Verkh-Isetskiy Metallurgical Plant telephones me. You understand, he says, no one wants to walk in the casting pit, you have to think of something. How do they make hot-rolled transformer sheet now? First they pour the cast metal into the pit, then they roll it. But, you understand, the process is quite lengthy and expensive. We proposed that they use continuous casting, and now they do this. I am convinced that in this case there will be no introduction problems: not only the plant but also the higher Uralchermet Association have agreed to our idea. The conclusion? The simplest thing to introduce is something that the manufacturers themselves believe in, and only when life itself compels them to do it; it's for sure that the chief engineer himself is standing in the pit. Certainly a scientific development should propagandize itself.

Volkov: Georgiy Lukich, was your proposal aimed only at eliminating a bottleneck?

Khimich: Not at all. Some of the workers were freed up from their work and, moreover, the output of billets will increase: whereas now they obtain 600 to 700 kilograms of rolled products from a ton of liquid steel, with continuous casting they will be getting about 900 kilograms. In short, more metal is being obtained without additional open-hearth furnaces.

Bashilov: Of course, a development should propagandize itself, but is it your opinion that this is enough for introduction? Unfortunately, in practice you often see something else. Many fine innovations that guarantee (guarantee, mark you!) enormous economic effect are quite often not introduced. Take those same continuous billet-casting machines, made by Uralmash. For a long time there has been no need to prove their efficiency. Notwithstanding, at many metallurgical plants, even the large ones, there are none of these machines. During the current five-year plan not a single installation has been built in the Soviet Union.

Glazkov: Something similar also happens in the electrotechnical industry. The Uralelektrotyazhmarsh Association produces output designed for generating electric power and its transmission and use, and each year we assimilate 60 or 70 new articles. And now we have a very complex innovation, a circuit breaker for the 1,150-kilovolt high-voltage power transmission lines. The first such line is being built from Ekibastuz to Ural. They are fine circuit breakers. They have undergone the most stringent testing and they will operate reliably. But what happens? The technical level of our circuit breaker is lower than the best similar foreign models. The porcelain that we use has

a mechanical strength significantly lower than products from the leading foreign firms. And the circuit breaker is essentially a 15-meter porcelain chain. The requirement is natural: a new article and a qualitatively new material for it. And we have had to reinforce an article made from normal porcelain with other elements, namely heavy glass epoxy cylinders. But this is superimposed and is not always reliable.

Bashilov: Willy-nilly, you still still wonder what the essence of the thing is. There are many causes. With regard to the continuous casting, the primary influence is the Ministry of Ferrous Metallurgy and the planning organs, where in principle they do not deny the great importance of of this kind of technical equipment for the enterprises but still do little enough about it.

Glazkov: Well obviously, it is not only inertia but also lack of interest in the final result that impedes things... Say, for example, that we need finished metal sections whose use would make it possible to sharply reduce labor intensiveness in the mechanical machining of parts. The metallurgical enterprises are capable of producing such finished sections. But we do not get them. This question worries everyone. Discussions are conducted at various levels. And you will find no leader in the ministry, the Gosplan or the plant who would be categorically against it. Everyone is "in favor" but the result is still a "zero." We must turn these kinds of parts ourselves at the plant. There are many such examples.

Khimich: Everything is simple, of course: if you take the viewpoint of the metallurgists, then why should they care about the machine builders? Do they derive any profit from this? It is pity that the narrow departmental approach operates. In essence any innovation requires the participation of workers in related sectors. And there is no interest in this. This, for example, is what happened to one of our other proposals. The essence of the proposal was that an analysis of the work of almost 30 machine-building plants in Sverdlovsk Oblast showed that as a rule metal billets are produced using poorly efficient methods. It is possible to set up the production of these articles using more productive methods: pressing, pressure casting, special kinds of spot rolling. Metal and funds are saved and people freed up. A special miniplant is needed for this. But here is the paradox. If it is subordinate to any one ministry the shipment of the billets to the various parts of the country will eat up all the savings. The conclusion is clear: the plant should be regional, intersector. Everyone agrees with our proposal in principle, but no machine-building ministry has been willing to take on the construction work, while in the USSR Gosplan they have not yet decided whether or not it should even be built!

Volkov: All these things are restraints on our national economy. Here is another example for your judgement. Some 8 to 10 percent of the energy derived from pumped gas is used to ship gas over great distances via the main gas pipelines. With each passing year the problem of reducing energy costs becomes more urgent because gas pipelines are constantly being built. Gas pressure in the pipelines is at 50 to 75 atmospheres, while consumers need gas at a pressure of 1.5 to 3 atmospheres. I will not get involved in the technical niceties. I say only that we have developed a special turbine that

makes it possible to use the excess gas pressure to generate electric power. Speaking generally, the turbine is very simple in terms of design, technology and materials, and for a major enterprise like, for example, the turbine and motor plant in Sverdlovsk, it is something of a consumer commodity... And the payback time for the capital investment for the turbine is less than a year, while the annual saving from each turbine is a minimum of R1 million; and at the electric power generating associations in the Ural power system about 30 of these turbines should be installed. Since 1976 we have been making representations to various authorities and proposing that the production of these turbines be set up. The turbine and motor plant agrees with our evaluation. But the turbines have not been included in its plan. Again we have a case of everyone supporting it with words while nothing is done. Why am I saying this? We, of course, hope to get a decision on this specific question at the highest levels. But there are many such questions. And the central organs are unable to make a special decision on each one of them individually. It is here that the economic mechanism should indisputably operate. What is needed is a system of economic incentives that would automatically come into play and prompt both scientists and manufacturers and consumers literally to seize an innovation that offers significant national economic effect.

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[A boxed insert in text reads as follows:] Scientists at the USSR Academy of Sciences Ural Scientific Center are doing basic research on the most important scientific and technical problems in solid state physics and chemistry, mathematics and mechanics, high-temperature electrochemistry, the theory of metallurgical processes, and problems of improving the efficiency of social production and the disposition of production forces in the Urals. The institutes of the Ural Scientific Center occupy a leading place among the scientific establishments of the USSR Academy of Sciences in some of the most important avenues of research in the field of the natural sciences.

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Scientific-practical conferences are held regularly in Sverdlovsk and they confirm recommendations on the introduction of scientific and technical developments for a 5-year period. There is a system for monitoring their realization. In the last 3 years alone a saving of R750 million has been achieved.

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#### Authors and Observers.

Skripov: Let us turn to the positive example with the Verkh-Isetskiy Metallurgical Plant that Georgiy Lukich talked about. The plant was in urgent need of continuous casting, and this already predetermined its success. But is it only the plant that needs it? Of course, others have needs, but notwithstanding they do not look to the new technologies or new construction but are satisfied by the usual methods. Let us say that, in the old way, the machine builders continue to produce many billets, in forges and primitive casting shops, even though special lathes and more efficient equipment are available.

Bashilov: The people at Verkh-Isetskiy themselves are also clients and consumers. In any other similar case it would be possible to turn to a manufacturer. But here, Uralmash acts this role, where the output of machines for continuous casting was assimilated long ago and where they have an interest in continuing this work. Moreover, it has its own special institute, the Scientific Research, Design and Technological Institute of Heavy Machinery Manufacture, whose workers are capable of preparing a project quickly. But just imagine that the functions were separated. Yet another reason that many innovations are not introduced lies in the far from ideal relations that prevail today between science, production and the planning organs. Working blueprints for many other continuous casting machines are gathering dust at Uralmash, even though assets are spent on research and the production of blueprints. The Ministry of Ferrous Metallurgy first planned these machines at the start of the present five-year plan for installation, for example, in West Siberia, at the Karaganda Metallurgical Plant, the plant imeni Zhdanov and at others, and then it had second thoughts. And so it has come about that in more than 3 years Uralmash has not produced a single MNLZ [expansion unknown: some kind of continuous casting machine--ed] machine and we still do not know when and to whom they will need to be delivered in the coming years. These machines are our very own Soviet flesh and blood, invented for the first time by the people at Uralmash.

Globin: How do you yourself account for this?

Bashilov: Life just forces us to make extensive use of continuous casting. It would be a fine thing to know today when, where and which machine to set up. In other words, what is needed is a goal-oriented program and a prediction of development in ferrous metallurgy, not only for ferrous metallurgy itself but also for us, the people who supply it with equipment.

Strictly speaking, relations between the consumers for new equipment and those who develop it have been established, if I may use the expression, back to front. This is a simple picture of things. Developers often receive an order formulated in a technical task: a machine must have such-and-such parameters. Proceeding from this the collectives of scientists and designers set to work. But in fact the client does not always know the level reached in this field of science. The technical tasks originate from the consumer's requirements and ideas and are often far removed from the leading achievements. And so sometimes we are given tasks to fabricate equipment which, if it is not yesterday's it is certainly not tomorrow's. Our proposal: it is not the consumer who should select the machine but the developer, who is in possession of the latest scientific information and knows the development trends in this direction in the world, who should suggest one.

Globin: This is a two-edged sword. Uralkhimmash supplies equipment for the chemical industry. In fact, industry is not always aware of the technology or the level reached in machine building. On the other hand, however, we also do not have a complete picture of the equipment needed for the very advanced chemical technology. The solution is found in close cooperation between the scientific establishments in these related sectors and us. Then the equipment and the technology will indeed be advanced.

Glazkov: The economic experiment that is now being conducted at the enterprises of five of the ministries, including our Ministry of the Electrical Equipment Industry, to some extent also gives priority to new equipment. We in the association must meet contractual obligations 100 percent for everything. This is the main requirement of the experiment. Of course, it is a most complex matter at the same time to supply the consumer with new articles on time. But if we do not cope with this neither the contractual obligations nor the plan will be fulfilled.

Bashilov: Uralmash is also operating under the conditions of the experiment, and more attention is now being paid to questions of new equipment. But life demands that the designer and technologist be given the opportunity to check more quickly what has been put in the draft. This means that the plan should include production of test orders for new equipment so that it would be possible to conduct tests and set up production and then start up series production and major complexes.

Glazkov: There is a party task from the December plenum: to raise labor productivity 1 percent above the plan and reduce prime costs half a percent. This means that we are the more obliged to introduce advanced technology, and the experiment is making it possible to accelerate this process. The levers of material interest are operating well. We have already felt this at the association. During the first quarter we received a good bonus, in particular for above-plan reductions in prime cost and for improved labor productivity.

Globin: And we are working in the old way. The enterprises of our ministry are not participating in the experiment. Let us examine this same problem from the standpoint of this kind of plant collective. We, of course, understand the importance of and need for the production of new output. And just the same... The collective assimilated a new product for the chemical enterprises, and moreover this output was much more efficient than the earlier product. It was very profitable for the state but not for the plant or the collective. Since the new product was cheaper than the old product (this, unfortunately, is the price paid for the existing pricing system) it was necessary to produce more in order to "cover" the plan. But prime cost, labor and so forth were higher than before. What good is this for the collective? Apart from the extra trouble it got nothing. I think that the experiment now being conducted will suggest in more detail a way of the situation.

Khimich: Under the law an inventor should receive material reward for his invention. So why is it that in fact a plant or collective that produces this innovation at the cost of much labor, keen-wittedness and inventiveness receives nothing? Perhaps it would be worth setting things up in such a way that the manufacturers would receive some allowance, for social needs for example.

Glazkov: I would like to remind you of another very important experiment that is being conducted in Leningrad and in which our own Elektrosila enterprise is involved. The essence of this experiment is well enough known: it is a matter, in particular, of overdue changes in evaluating the labor of designers. There may be less of them but they should be recompensed according to their specific contribution rather than according to an established schedule and category. The main thing is that there is no need to enlarge the wages fund, but the returns from the design bureau still grow. Things should be arranged

so that any worker who wanted could be involved only with his own direct affairs and not, to speak metaphorically, spend his time trying to sweep all the sand off the beach. This is, moreover, direct fraud against the state.

Bashilov: But the problem is even more profound. In fact everyone should be engaged only with his own affairs. It becomes absurd: in general a chief designer cannot be responsible for a machine developed under his leadership. Let me give you a simple example. A machine, the "Malyutka" washing machine, now well-known to consumers, was developed at Uralmash. And in order to confirm it, it was necessary to collect 136 signatures in various organizations and departments literally all over the country. And none other than the chief designer had to bear the responsibility for the innovation; so why must people who are not responsible for the final result "agree" it and give permission for its production? We were recently directed to change the motor in it; we receive it as a subassembly. Those who made the new motor had the task of making it lighter and capable of multiple-purpose use. And they did it, and saved on metal. But the motor cannot operate in the mode that has now become usual in practical operation of the "Malyutka." We have expended all our efforts to show the impossibility of using it in the machine. And they can suggest nothing simple other than to limit the length of the wash cycle in the "Malyutka." And so we accept the motor, and the machine takes longer to cool down than it does to wash. And today this has been written into the state standard! And so we have ruined a perfectly good machine and we, the manufacturers, must be answerable; there is your paradox.

Khimich: And note this carefully: the 136 signatures also include the official signature of the chief designer, but it carries the same weight as the others. He bears one 136th part of the responsibility! When I worked at Uralmash I frequently encountered similar stories, and then it was a question not of a "Malyutka" but of blooming mills.

Glazkov: The official signatures are necessary, but not so many. And who prepares these official signatures? They are not sent to some little secretary. They go to qualified specialists capable of proving their case and of sitting in reception rooms and proving and explaining and persuading. And often an innovation is delayed because the procedure drags on for months, and sometimes years. This is what I think: what would these losses from red tape be if computed on a statewide scale?

Bashilov: It is time to return to the significance of the technical project, as it used to be, and to return authority to the designer.

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[A boxed insert in text reads as follows:] Over the past 10 years the oblast's industrial potential has grown 54 percent. In industry the plan for the first 3 years of the five-year plan was overfulfilled and above-plan improvement in labor productivity was achieved. The profit plan, which for the 3 years amounted to more than R8 billion, was overfulfilled. The number of enterprises failing to fulfill the plan declined.

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Over the last 3 years the proportion of those engaged in manual labor in industry decreased 3.5 percent.

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Through the realization of creative plans and pledges by engineering and technical workers, at the Uralmash Plant alone, since the start of the five-year plan a reduction in labor intensiveness has been achieved equal to the freeing up of 2,000 workers, and labor intensiveness has declined 4.6 million norm-hours.

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#### Cross-Checking.

Khimich: I fear that this is what will happen if some degree of order is brought to the procedure: some scientific research institutes will simply do nothing. If you take away from the workers at the institutes, and indeed from all other kinds of establishments, the right to issue official sanction there will be no other trace of their activity and nothing will be left. The joke is that in fact we already have too many institutes and they are all working on their own plans, which no one ever coordinates. As a result, in a best-case situation they are duplicating each other's work. Perhaps it is worth at least linking the existing scientific research institutes more closely with the specific needs of production.

Globin: That's right! Uralmash maintains contacts with 38 institutes. It has agreements for the entire five-year plan with some of them. We are working on 25 themes with the Ural Scientific Center. We cooperate closely with the Institute of Electric Welding imeni Paton and with the head institute in the sector--the Moscow Scientific Research Institute of Chemical Machine Building. The return from this is undoubtedly great. And still sometimes we envy Uralmash and Uralelektrotyazhmarsh, which have their own scientific research institutes. Is it impossible for us to have some institute or another? Or let it at least service a group of related enterprises. But work on our subjects rather than only its own. We must provide the chemical industry with good equipment, and as you see, we have links with many institutes, but we do not deal with them systematically but only when we find time. I think that we are losing much by this.

Skripov: I have the impression that the problem is not just in the number of scientific research institutes but their quality. The sector institutes are increasingly becoming the center of gravity for project and design work. At the same time they do not so readily pick up the worthwhile ideas offered by academy science and develop them for the needs of their own sector. Yuriy Petrovich [Glazkov] talked about new high-voltage circuit breakers, mentioning that the same level of new materials has not been reached in their fabrication. But must we wait until the porcelain problem has been solved by the all-union sector institutes outside the Urals? Here, locally, for example, we have the Institute of Refractory Materials. And what if the Uralelektrotyazhmarsh Association recruits it to solve this essentially comprehensive problem? And

what if the associates at this scientific research institute turn to academy science for new ideas? I think that the final result will be obtained much more quickly. In my opinion, this is an acceptable model of cooperation for any development. Production is capable of being more active in seeking out suitable ideas without waiting until everything has been developed to the stage of clear introduction.

Globin: But why then should academy science have its own design bureaus, and, as is known, many of them?

Skripov: The design bureaus exist and their numbers are in fact increasing. But in my opinion the academy establishments should not be transformed into applied establishments.

Khimich: Perhaps it is worth thinking about other organizational forms. What if we try to create special creative brigades made up of the most experienced and qualified specialists from the plants, the scientific research institutes, the academy institutes, and send them to the enterprises? So that they could examine things in a fresh way, with an impartial view, as it were. There would then probably be proposals on improving technologies, developing means of mechanization and much else. Suppose that the plant adopted the proposals of the creative brigade. Then there would be a need for research, and this could be done in the same scientific research institute. I think that it would be possible to make solid improvements in existing production.

Bashilov: And what about the plant's own scientific research institute? Will outside people be involved?

Khimich: For the plant itself, no. What is the idea behind my suggestion? The plant workers have already grown accustomed to the level of their own production. But a new man can make discoveries here.

Volkov: In the well-known decree on accelerating scientific and technical progress the CPSU Central Committee and the USSR Council of Ministers also expressed themselves in favor of the broad development of initiative, particularly on the organizational plane.

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[A boxed insert in text reads as follows:] More than 30,000 brigades in the oblast have adopted pledges for the ahead-of-schedule fulfillment of their five-year plan tasks, and more than 10,000 of them are working ahead of their plans. One brigade in four has taken up the initiative "the Five-Year Task with Fewer People" issued by the Sverdlovsk people and approved by the CPSU Central Committee.

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Within the oblast the proportion of top quality output that is certified is 39 percent. This is an increase of 12 percent over the past 3 years. It amounts to 1,750 articles. Comprehensive quality control systems have been registered at 560 enterprises.

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[The following four paragraphs are printed in italics--ed] We see that those participating in the SOVETSKAYA ROSSIYA roundtable discussion have covered quite a broad range of problems both of a general and of a quite specific nature: how to eliminate the narrow departmental approach in the development and application of innovations; what intersector incentives should be used to insure a high final national economic result; how to increase the interest of production, research, design and other collectives and how to bring the large group of sector institutes closer to the resolution of introduction tasks; how to strengthen the link between the different scientific disciplines and improve labor productivity in their collectives; and much else.

The editorial office appeals to the USSR State Committee for Science and Technology, the USSR Gosplan, the Presidium of the USSR Academy of Sciences and all interested ministries and administrations and asks them to express their attitudes toward the problems that have been touched upon.

Of course, the questions dealing with improving the mechanism for introducing scientific and technical developments do not exhaust the subject. In our opinion, therefore, it would be worthwhile to continue the discussion. We invite party, soviet and economic workers, scientists, specialists and representatives of the public to participate.

The production of output at the level of the best world models, improvements in labor productivity at accelerated rates, and reductions in the prime cost of articles are possible only by constantly renewing production, making use of advanced equipment and technologies. This is precisely how the question has been posed in the decisions of the 26th CPSU Congress and subsequent CPSU Central Committee plenums, and in the speeches of CPSU Central Committee general secretary and chairman of the USSR Supreme Soviet Presidium comrade K.U. Chernenko. And it is this that should be an accurate landmark for action.

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## SUMMARY OF COMPREHENSIVE SCIENCE, TECHNOLOGY PLAN FULFILLMENT

Baku BAKINSKIY RABOCHIY in Russian 1 Jun 84 p 3

[Article by G. Ismaylov, deputy director, AzSSR Gosplan Scientific Research Institute for Economics, S. Kasumov, department chief, N. Yesayan, sector chief, candidate of economics: "The Fulfillment of the Comprehensive Program for the Reduction of Manual and Heavy Physical Labor Should be According to a Single Plan"]

[Text] The April (1984) CPSU Central Committee Plenum affirmed the great economic importance of large social and economic programs. A thorough analysis of their fulfillment and a determination of key problems and prospects for the country's economic development in the next five-year plan are especially important. Attention should be given to the complicated and multifaceted links between regions, sectors and spheres of the national economy. Program objective planning and management of science and technology have been more widely used recently.

The "Comprehensive Program for the Scientific and Technical Process in the Period up to the Year 2005" should become one of the most important tools for realizing the economic tasks posed by the party. It is being worked out for the country as a whole and for individual regions and union republics. It is very important that it be closely coordinated with the resources necessary for its implementation. This will make it possible to use it as a base for economic and for scientific and technical targeted comprehensive programs.

The great importance of introducing program targeted scientific and technical development methods for our republic's economy was discussed at the Azerbaijan Communist Party Central Committee December 1983 Plenum. It also pointed to shortcomings in this work. It was noted at the plenum that planning organs and scientific institutions have still not been able to work out a well structured system of measures directed toward assuring an integrated, systems approach to planning and managing scientific and technical progress. This leads to considerable dispersion of material resources and efforts, to increased time for the introduction of achievements and to research far removed from the national economy's needs.

The program targeted method of management has already given positive results in solving a number of socio-economic and scientific-technical problems. Several sector and intersector programs have been developed. Their implementation should increase the production of the most important agricultural products and a number of mass consumption goods.

A program for the rational use of labor resources and the reduction of manual and heavy physical labor during the 12th Five-Year Plan and over the long term is being compiled. It will use experience acquired in the republic. A comprehensive program for the reduction of manual and heavy physical labor in industry and transportation during the 11th Five-Year Plan is now being implemented.

The implementation of more than 10,000 measures is foreseen. These cover mechanization and automation, progressive technology and improvements in work organization and conditions. Outlays for these purposes total 100 million rubles. The expected annual economic effect is 73 million rubles. Thus, outlays are to be repaid in 18 months.

The program covers 111 all-union and republic ministries, departments, associations and enterprises. The most important task is to support their cooperation. Program targeted management places barriers before narrow departmental tendencies. At the same time it expands local initiative, supports decision making for current operations, especially for new work themes and interdisciplinary research. It also brings an element of self-regulation into management.

The implementation of this comprehensive program should release more than 20,000 workers from unproductive and heavy physical labor. This is its great social significance. It is directed first of all towards creating favorable working conditions at enterprises.

Our institute has surveyed the program's implementation. In general this work is successful. About 4,000 measures have been taken. Their total economic effect is 37 million rubles. This is more than planned. Nine thousand five hundred workers have been released from manual labor. The indicators attained exceed the planned ones by 1.5 fold.

The republic ministries of Motor Transport, Communications, Cotton Cleaning and Local Industry and Minmontazhspetsstroy [Ministry of Installation and Special Construction Work] have overfulfilled their targets. These plants are ahead of schedule: the tire, experimental Elektroshtamp and experimental Geofizpribor in Baku and the plastic processing plant in Sal'yanskiy.

However, there are still several shortcomings in the program's implementation. Twenty seven organizations have not met their targets. Serious lagging has been allowed by: Azerittifak, Azglavenergo, Glavazmelivodstroy [Main Water Resources Construction Administration], The Ministries of Rural Construction, Land Reclamation and Water Resources and Housing and Municipal Services. Those not meeting their targets include the Khimprom Association and the following plants: the Baku instrument building, experimental, the Neftekhimpribor SKB [Special

design office], the high voltage equipment and Mingechaurdormash. The Dzegamsel'mash plant and the motor transport enterprise of republic Gossnab have not completed a single planned measure.

It is alarming that about 80 percent of the organizations participating in the program have deviated from it. This is evidence of the insufficient level of planning, to some extent of a strictly formal approach to the matter and of weak control over target attainment.

It should be admitted that for many organizations, particularly those mentioned above, the comprehensive program has not yet become a guide to action and has not yet acquired the status of a normative document. Unfortunately, many ministries and departments are not organically tied to sector plans. The legal and financial aspects of implementation have not generally been precisely determined.

In our opinion we should begin with organizational work. We are talking about the creation of a mechanism for managing program implementation. It is necessary for eliminating contradictions between the specialization of management functions and their integration, between the individualization of sectoral administrative organs and the coordination of their activities.

In our view, the following steps should be taken to improve the situation: First, work organization should be entrusted to ministries and departments. Second, it necessary to determine the main organizations for controlling program implementation. They will verify how targets are given to executors, analyze the results attained. A standardized methodology for accurate evaluations should be selected here.

The competence of executors is very important for program realization, both for compilation and for the management of its fulfillment. The weak link is right here. To a great extent this is a consequence of VUZ's insufficient attention to the training of specialists in new areas and to the lack of facilities for retraining specialists, above all, management workers. It appears advisable to have VUZ's expand programs in organization and management and to set up a center for retraining national economic management workers.

It is worth thinking about how to set up commissions to manage program fulfillment. As a rule, they are now headed by officials who, because of their work load, cannot give much time or attention to commission activities. A different set up is obviously needed.

Serious concern should be given to the information base. In many cases organizations working on the program do not have the necessary data. Sometimes ministries, departments and associations do not set up work groups, which should have the required information, or they only exist formally. Our institute has also experienced an acute shortage of initial materials. We repeat: Experience in the development and implementation of the present comprehensive program should be studied and become the basis for compiling programs for the 12th Five-Year Plan. It is therefore important not only to achieve what is intended, but to give close attention to improving work quality at all levels.

## PATON WELDING INSTITUTE RECEIVES AWARD

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 19 May 84 p 2

[TASS article: "For Innovative Scientific Search"]

[Text] In the half century of its existence, the UkrSSR Academy of Sciences' Electric Welding Institute imeni Ye. O. Paton has been transformed into a powerful scientific and technical complex. Its collective is constantly expanding basic and applied research and diligently looking for new forms of ties with production in the interests of further strengthening the country's economy.

The institute was awarded the Order of the October Revolution for great services in the development of science and technology in welding and special electro-metallurgy and in the training of scientific personnel.

Today [17 May], at a collective meeting held to celebrate this, V. V. Shcherbitskiy, CPSU Central Committee Politburo member and first secretary of the Ukrainian Communist Party Central Committee, attached the high award to the institute's banner. Speaking to scientists and specialists, he stressed that the high award to the Paton Institute collective is not only general public acknowledgement of its impressive achievements, but also is evidence of the Communist Party's and Soviet State's great concern about the fruitful development of science as a direct productive force and of the powerful intellectual potential of our socialist society.

The institute, at which the USSR National Committee on Welding is working, is the country's head scientific institution in this field. Its fame has been won by the intense, selfless work of many scientists. However, it would be most just to first mention the name of this school's founder, Yevgeniy Oskarovich Paton, a scientist, harmoniously combining a love of science with precise engineering calculations, a bold decision maker, talented organizer a great worker and patriot.

After noting the Paton collective's large contributions to the first five-year plans, the victory over fascism and the postwar reconstruction of the economy, V. V. Shcherbitskiy described the results of scientists' innovative research which technologically transformed many production processes. In close cooperation with other scientific collectives in the country, the institute created, developed and found widespread practical applications for various methods of

welding: in carbon dioxide and other gases, plasma and electron beam, and explosion welding. Successful work is also being done on laser and ultrasound welding, friction welding and on outer space technology of metals. The contemporary scientific level and fundamental innovations of this work is shown by 5,000 author's certificates and more than 1,500 foreign patents. The institute collective is the coordinator of welding work among CEMA members.

A state approach and a high level of professional training have become the ground from which the institute has raised a pleiad of talented scientists. A Paton school of science has been created. It now includes 17 Lenin Prize winners and more than 100 winners of UCSR and UkrSSR State Prizes and USSR Council of Ministers Prizes.

The most important characteristics of the Paton collective's activities are their focus on the solution of urgent national economic problems and a comprehensive approach to the organization of scientific research. It is now difficult to imagine an academic scientific institution without a design office and experimental production operations. It was this collective which proved in practice that just such a work structure and organization assures a maximum return on scientific potential and plays a major role in strengthening ties between science and production.

The institute's party organization, made up of almost 1,000 communists, is the powerful and militant nucleus of the collective. By their personal examples party members provide a model of creative attitudes towards labor. They diligently work to improve the results from scientific research and are initiators of competition to accelerate scientific and technical progress on the basis of a close association of the efforts of scientific institutions and industrial enterprises.

V. V. Shcherbitskiy described institute workers' tasks flowing from the decisions of the February and April (1984) CPSU Central Committee Plena and CPSU Central Committee and USSR Council of Ministers decrees on problems of accelerating scientific and technical progress in the national economy. As comrade K. U. Chernenko stressed at a meeting with workers at the Hammer and Sickle Plant, in the present stage it is especially important to modernize sectors and introduce the latest achievements of science and progressive experience. This is an urgent command of the times.

V. V. Shcherbitskiy expressed confidence that scientists and all workers at the institute would continue to make further contributions to the further development of effective forms of cooperation between science and production and in accelerating the practical introduction of scientific achievements.

In the name of the collective, B. Ye. Paton, institute director and twice awarded as Hero of Socialist Labor, expressed sincere thanks for the high evaluation of the institute's contribution to accelerating scientific and technical progress.

V. S. Krasnoshchek, a fitter at the experimental production shop and D. P. Novikov, a senior scientific associate gave their hearty thanks for the high

evaluation of the collective's labor and made assurances that it would continue to move in the front ranks of Soviet science. The following congratulated the Paton collective: Academician A. P. Aleksandrov, president of the USSR Academy of Sciences, V. K. Sotnikov, general director of the Urals Railcar Plant, Academician G. A. Nikolayev, rector of the MVTU [Moscow Higher Technical School] imeni N. E. Bauman, V. T. Saykin, general director of the AvtoZIL Production Association, V. V. Ryumin, USSR pilot and cosmonaut, V. A. Izvekov, general director of the Bol'shevik Production Association in Kiev, Ya. Skriniar, president of the International Institute of Welding and director of the Czechoslovakian Research Institute for Welding.

Participants at the meeting unanimously approved a letter to the CPSU Central Committee and to comrade K. U. Chernenko.

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## INSTITUTE DIRECTOR ON UZBEK, UKRAINIAN COOPERATION

Tashkent PRAVDA VOSTOKA in Russian 16 May 84 p 3

[Article by A. S. Davydov, director of the Institute of Theoretical Physics of the Ukrainian SSR Academy of Sciences: "Community"]

[Text] The Tashkent Science Center, established 2 years ago, is involved with strengthening ties between science and production based on the development and realization of special complex programs. Among the tasks that the center is successfully resolving is the further development of scientific cooperation by scientists of fraternal republics in the area of fundamental research.

The article by A. S. Davydov, director of the Institute of Theoretical Physics of the Ukrainian SSR Academy of Sciences, hero of socialist labor, winner of the Lenin Prize and member of the Ukrainian Academy of Sciences, is dedicated to the cooperation of Ukrainian and Uzbek scientists in the area of theoretical physics.

Here is our country, fundamental research is being carried out by the USSR Academy of Sciences, the republic academies of science, and many universities and institutes of the Union republics. The Uzbek Academy of Sciences has also achieved tremendous success in developing this research. Science in fraternal Uzbekistan has now reached advanced frontiers. Outstanding scientists are at work in the republic and they have established their own scientific schools. The fraternal and unselfish community of all peoples of our country played a large role in the rise and development of science in Uzbekistan.

An outstanding example of the vivifying power of the fraternal friendship of Soviet peoples is the development of Uzbekistan of the physics of the atomic nucleus and elementary particles. This work began as early as 1948 with the support of many of the country's leading scientists. In a relatively short time, what were then highly effective experimental installations were created, with the help of which important results were obtained and highly qualified personnel were trained, people who knew how to take charge of work actively and purposefully.

And today the close cooperation of Ukrainian scientists with Uzbek colleagues is producing significant results. For more than 10 years now, I have been directing the Institute of Theoretical Physics of the Ukrainian SSR Academy of Sciences, and throughout these years many institute departments have cooperated closely with Uzbek theorists. This cooperation is useful for both sides. In recent years, in particular, Ukrainian and Uzbek theorists have been involved with the study of the nature of strong interactions and the related problem of the structure of nuclear particles--nucleons, pions and others. Experiments with high-energy particles that were carried out during the last 10 years showed that nuclear particles have a composite nature and now there is hardly any basis to doubt the fact that these components, quarks, do exist, although they have not been found directly in experiments.

The model that became the working instrument of physicists who study nuclear forces was first proposed by theorists from Dubna and perfected by theorists from the Massachusetts Institute of Technology. Prof M. M. Musakhanov of Tashkent University took the next step in developing the theory. He created a perspective generalization. This made it possible to solve a number of problems in nuclear physics at a new level.

This work received the recognition of the broad scientific community and is now applied in many research projects being carried out in scientific research centers both here in our country and abroad.

Analogous research is also being carried out successfully at our Institute of Theoretical Physics. It must be said that the physicists-theorists of Tashkent University are actively cooperating in this area with their Ukrainian colleagues, they often speak at seminars at our institute, and they carry on joint research. The results of this cooperation have been very fruitful. This allows one to hope for the success of joint research in other areas as well. Thus, in recent times, useful cooperation of our institute with the physicists-theorists of Tashkent University is coming about in the investigation of nonlinear systems, in particular of nonlinear waves-solitons.

Beginning in 1973 at the Ukrainian SSR Institute of Theoretical Physics, we sought to use the notion of solitons to explain the great effectiveness of the transfer of energy in protein molecules in the vital process of biological objects. Based on theoretical research, we are developing a new hypothesis to explain the mechanism of the contraction of muscle fibers, a hypothesis that is now beginning to receive experimental confirmation. Cooperation has begun with Uzbek colleagues in these fields, and we are certain that it will also be fruitful.

It is well known that an evaluation of what has been done depends to a great extent upon what we are comparing it with. If we make a comparison with the formative years of Soviet science, then our successes are huge, but they are far from adequate if we bear in mind the tasks before us. It is therefore essential to do even more to strengthen cooperation between the scientists of the country's fraternal republics.

## GOALS OF NEW PRODUCTION ASSOCIATION OUTLINED

Tbilisi ZARYA VOSTOKA in Russian 18 Apr 84 p 2

[Article by Muradi Varlamishvili: "Start of the Experiment"]

[Text] The purpose of the newly established production association "Gruzpishchemash" of the USSR Ministry of Machine Building for Light and Food Industry and Household Appliances is the production of automatic lines.

"Gruzpishchemash" includes the Tbilisi Machine Building Plant imeni Ordzhonikidze along with its subordinate Tbilisi Plant imeni 26 Commissars, the Batumi Machine Building Plant imeni 60th Anniversary of the USSR with primary production in Gali and a branch in Keda, the Khashuri Machinery Plant, the Batumi "Bytmash" Plant, the Tbilisi GSKB [State Special Design Bureau] "Prodmash" with its experimental plant now under construction, and the Tbilisi SKTB [Special Design-Industrial Bureau] with the Akhalkalaki Experimental Plant.

"In view of the fact that there has recently been a significant increase in the volume of raw materials being procured, including with the help of tea-harvesting machines, there is now an acute need to increase the capacity of the tea industry," relates Georgiy Tsintsadze, chief administrator and general director of "Gruzpishchemash." "The fact is that at times of intensive work, the daily capacity of the tea factories is not sufficient for a timely processing of raw material in exact conformity with technology. As an experiment, therefore, we established our association, one of the main tasks of which is to develop the tea industry and to provide it with modern equipment."

A few days ago, representatives of "Gruzpishchemash" met with tea industry workers, discussed the quality of machines already in existence, and listened to comments, which will be considered in the further work of machine builders. In the near future, there will be similar meetings with the collectives of enterprises of the winemaking and canning industries.

The new association intends to maintain working contacts with the scientific research institutes and institutions of the country and the republics for the purpose of minimizing the time required for the creation of modern industrial equipment and its assimilation into production. Its two design bureaus staffed with qualified specialists will be a strong help in this work.

The creation of the "Gruzpishchemash" Production Association, uniting enterprises and institutions that have an independent balance and are therefore interested in the efficiency of their work, makes it possible for the association management to combine specialization and cooperation more harmoniously. For example, the Khashuri Machinery Plant, with the most modern equipment, does not produce any sort of finished goods. It was decided to start production of automatic machines for canning plants here as well as equipment for tea factories.

With the establishment of the association, favorable conditions arose for increasing labor productivity and reducing the cost of production, for growth in the return on investment and increasing the shift coefficient, for increasing the rate of consumer goods production and for saving materials and energy resources.

The course has been set for increasing the capacities of the enterprises of "Gruzpishchemash." Production buildings are already being constructed for the Batumi "Bytmash" Plant, the Gali branch of the Batumi Machine Building Plant and the Tbilisi GSKB. In the future, work will be continued to reconstruct and expand association enterprises and institutions and to construct housing and cultural and domestic projects based upon the "Gruzpishchemash" program of social and economic development, which is now being worked out by order of the Georgian Communist Party Central Committee, the Georgian SSR Council of Ministers, and the USSR Ministry of Machine Building for Light and Food Industry and Household Appliances. And the production program of the new association includes tasks to create and produce automatic and continuous lines for the food industry.

The young collective "Gruzpishchemash" realizes that this experiment presents it with important tasks. To a considerable degree, their solution depends upon the skillful work of the association's administrative apparatus headed by Georgiy Tsintsadze, an experienced organizer of production. In scores of years of work in various subdivisions of the Batumi Machine Building Plant, where he was first promoted to head engineer and to enterprise director in 1962, Tsintsadze accumulated much experience and showed his abilities as manager of a labor collective. It was there that he was accepted into the ranks of the CPSU in 1957. From the end of 1975 until recently, Georgiy Tsintsadze worked as first deputy chairman of the Adzhar ASSR Council of Ministers. And now they have entrusted him with the management of the complicated mechanism of administering "Gruzpishchemash," the enterprises of which are scattered throughout Georgia.

"We understand that a number of problems are facing us, especially now, in the formative stage," says Georgiy Tsintsadze. "But we see clearly the tasks resulting from the decisions of the most recent plenums of the CPSU Central Committee and the Georgian CP Central Committee. And we are not sparing any efforts to see that those hopes that were placed on this experiment are justified.

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